# ELECTRICAL WORLD

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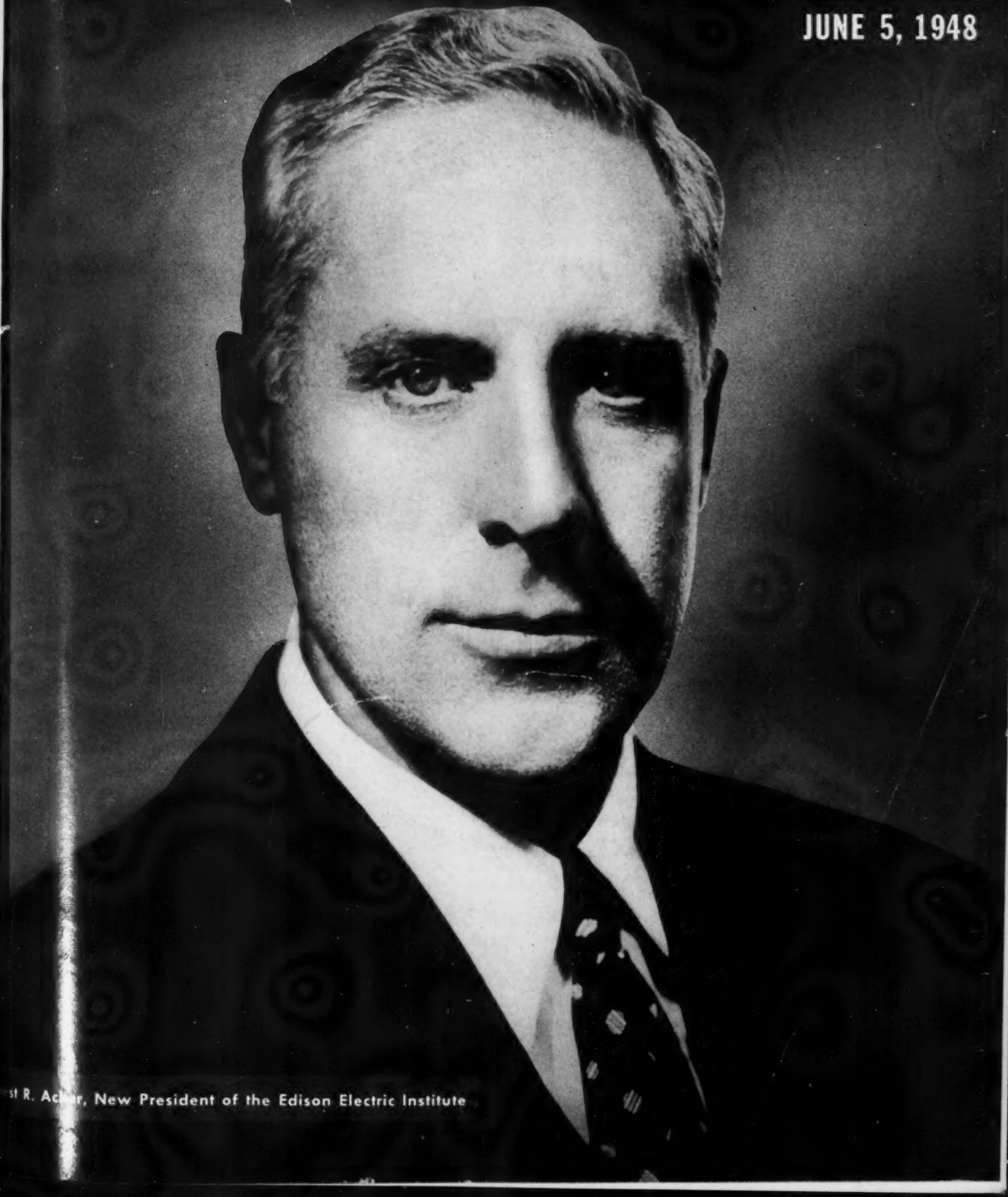
JUNE 5, 1948



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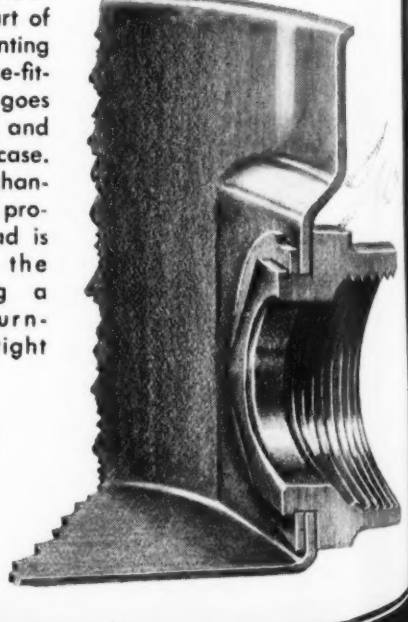

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# ELECTRICAL WORLD

**Published for 74 years for those engaged in the business of generating, transmitting, distributing or applying electric power**

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**COMING IN THE JUNE 19 ISSUE**

**River Span Requires Varied Tower Design**
**Providing Fire Protection For Transformers**
**How Electric Ranges Stimulate Other Uses**

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ELECTRICAL WORLD — Editorials

JUNE 5, 1948

# The E E I – Industry Job Ahead

IN THE WORDS of EEI's new president, Ernest R. Acker, four major problems will face the privately-owned electric utilities—and their association—in the next 12 months.

The industry's major problem, Acker feels, is that of capacity and war preparedness. EEI's latest statement on this indicates that, while tremendous progress has been made on installation of new capacity, continued load growth has left a disappointingly small net gain in reserve, particularly in view of the great effort put forth by the industry. Last year, the national reserve margin was five percent. A very recent study indicates that this year's will be six percent. This is a narrow margin in view of the outlook for continued high levels of business activity and load growth. The fact that everyone wants more and more of the best electric service in the world, coupled with the fact that it's going to take time to get it, may cast some light on the necessity of any "public information" program the industry may be considering.

A second major problem is that of financing — and rates. Happily, the stock market has regained consciousness, or so it appears. It's done so at about the last possible minute, as far as equity financing for the power business' expansion program is concerned. If this turnabout proves real and the financing problem is vastly diminished, then one strain on existing rate levels will be eased. On this point, the comment can only be "speed the day."

An additional problem is that persistent "industry program for factual publicity and public information." It has bobbed up and down for a long time and now has wide industry support. The year's problem: to devise a way of setting it up properly and financing it. This needs no further comment than another fervent "speed the day, one is needed."

An industry research program is the final big problem. A large section of the industry favors independent, fundamental research of a type not now covered by the manufacturers. But the proposed program still lacks unanimous support, the question being whether group research on an industry-wide basis can be conducted effectively. Also, there arises the question of timing, in view of the great demands of meeting present and potential load growth. Presently, sentiment seems to favor putting a capable director on the EEI staff, giving him a strong industry technical committee and having those most interested work with him on the development of a program which can be submitted to the industry for broad support, financial and otherwise. This industry, we recall, has a long, proud history of research and has profited for having performed it. Today seems hardly the time to spurn one of the things which has helped make the industry great.

All this leaves the industry—and its biggest association, EEI—with a large year ahead. None of these problems will be easy to solve. Solutions will have to be derived under the pressure of major distractions—a cold war, a hot campaign, a new administration, an old attack. What a need exists for competent, courageous, adult leadership! And what an opportunity awaits those enterprising souls who can supply it!

## Proof Of The Pudding

EEI PRESIDENT Charles E. Oakes closed his year in office this week with a ringing plea that the industry redouble the fight to preserve private ownership in the electric power business. Good! We have an excellent suggestion.

Before the Senate is the nomination of Thomas Buchanan to membership on the Federal Power Commission. We are told that the power business has decided to leave its participation in the hands of the Pennsylvania companies. Buchanan being a Pennsylvanian and having served on Pennsylvania's Commission, this seems logical enough.

We're told also that if the nomination comes to a floor vote on the record so far, Buchanan will be confirmed; and that certain senators who oppose the nomination are complaining that they are unable to get utility people, other than West Penn's H. L. Mitchell, who oppose the nomination to appear against Buchanan. They wonder, we hear, where the industry is.

Four years ago, one of the industry's foremost leaders said the private power business failed to oppose the nomination of Leland Olds for a second FPC term because it was believed he'd "hang himself" through ineptitude; that because of his disfavor at the Capitol, he'd do the industry more good on FPC than off it. Four years certainly have proved that one pretty silly, we'd say.

Of course, one of the first things one hears in the power business when the suggestion is made that some one stand up to FPC is the same old complaint: "They'd lay for us, go into our books looking for something, or refuse a license application, or a permit for an emergency interconnection, or hold up a security issue."

That's why we were so glad to hear Oakes' speech at Atlantic City this week. It'll be a tough job to preserve private ownership in the power business with men like Buchanan on FPC. So here's one battle for the Pennsylvania presidents to fight. They are the ones who know Buchanan best. They can recall the years at Harrisburg, when, so far as Buchanan was concerned, utilities were always wrong, early and late, high and low, this side and that—just wrong, period.

We trust that they won't leave it to the gas industry alone to make this fight, as it was left against Olds four years back.

## Marketing Atomic Power

ATOMIC ENERGY COMMISSIONERS don't often dig very deeply into the atomic-electric power end of their jobs, at least in public pronouncements. Mostly, AEC comments just describe today's thinking on how a power pile would operate, what the problems are today, and estimate about how long it will be until power from the atom is used at all widely.

Thus, there's considerable interest in the following comment of Commissioner Sumner Pike:

"There is one consideration that I did not mention in my previous remarks. That is that reactors which are built primarily for other purposes also produce heat which, as in the case of the Brookhaven (Long Island) reactor, can be used to produce auxiliary power. It is very possible that with improved design, such reactors may have power for disposal as a by-product and, of course, it is normal to expect that if this turns out to be a fact, such power will be sold on the market for what it will bring—the revenues to be used as a credit against the cost of reactor operation."

If Commissioner Pike's thoughts turn out to be realities, well and good. That's the way we think all atomic-electric power ought to be handled, whether produced by power piles or piles built for other purposes. History of the last 15 years, however, points to a very different pattern for the distribution of power which "just happens" to come into being at federal projects. For instance, the TVA Act got us a public power monopoly in one state. The PWA act made possible the same thing in Nebraska. The Reclamation Act bids fair to get us the same thing in a third state, Washington. The Flood Control Act of 1944 was the basis for an attempt at the same thing in the Southwest, with the Southeast and other regions still to be heard from.

It's difficult to believe that no attempt will be made to use the Atomic Energy Act as the basis for still more such excursions. After all, the late President Roosevelt proposed that the government-constructed steam plants built for the war be made available thereafter to public power systems (ELECTRICAL WORLD, January 22, 1944, p. 126).

In view of all this history, somebody is bound to have the same idea about whatever power AEC ultimately will have to dispose of. (The first of this, incidentally, is scheduled to come in at Brookhaven quite soon, perhaps enough to operate approximately half of the pile's auxiliary equipment).

Again we concede that the time for AEC's decision on the matter is still pretty well removed. But again we insist that, since such a decision ultimately will have to be made, the time for the power business to get on the record—and on the job—is right now. If it's worth a paragraph of Pike's valuable time, it certainly isn't a dead issue.

## Union Now

". . . THE MAIN EXPLANATION of the present firmness of the (security) markets (in England) is the existence of a substantial surplus of money available for investment, and a comparatively small field for its use."

This happy condition is described in a *New York Times* dispatch from London, and it wasn't dated a decade ago. It was dated April 26, hard as that may be to believe. If the British have investment capital and a decreasing field of investment, the U. S. power business can remedy things in a hurry.

# NEWS OF THE ELECTRICAL WORLD

## The Electrical Week

Engineering men heard committee reports at the 16th annual EEI convention in Atlantic City this week, reiterating the familiar theme of selling and more selling. They also heard that college graduates were looking more favorably on the industry and that a new committee would tackle problems arising from the capital expansion program . . . Chicago's new Adjustment Board, under terms of the new franchise, will not infringe upon the jurisdiction of the Illinois Commerce Commission . . . In Hot Springs, 18 pioneers of the electric motor industry were feted by NEMA at a 40-year anniversary banquet . . . PUAA urged closer cooperation between management and advertising managers at its annual convention in Cleveland.

*No wonder production of electric appliances is sky-high. One leading manufacturer is giving its appliances away on 16 radio shows besides those it sponsors.*

Another complexity of Western Civilization reached Korea last week. Daylight Saving Time was ordered into effect to help offset the power shortage which resulted when the Russians cut off the energy flow from their part of the country. If the farmers there follow the farmers here, they'll probably demand an immediate return to Confucian time.

*Home freezer sales are a big disappointment to electric utilities. One leading New York utility will abandon their sales after this year if they do not improve. Sales costs are too high.*

What-a-Difference-Dept: All but 112 of 1,776 eligibles voted in the recent NLRB election to determine a bargaining agent for production workers of the Duquesne Light Co. A day or two later in Detroit, only 700 of 5,500 eligibles in a General Motors United Auto Workers local voted on whether to strike.

*Operators of Shasta Dam began spilling water soon after California's brown-out ended. In the first seven days of spilling, they lost the equivalent of 3,800,000 kwhrs, or as much as was saved by the first three weeks of California's "voluntary" conservation campaign. For one month when power was curtailed, and before the spilling, one machine stood idle because water had to be saved.*

High costs are becoming a problem in another phase of the utility business. Advertising managers at the PUAA convention took down their hair to discuss comparative costs of reproduction processes, gang runs, repeating ads and more uses of the same art work.

*Whistling-in-the-Graveyard Notes: Bonneville Power Administration proponents are telling Congress that "The cost of harnessing atomic power for electric generation" probably will be "around four times the cost of such high-grade power as can be produced on the Columbia" by hydro plants. Oregon's Sen Morse made this observation during a recent plea for more funds for McNary Dam and other projects.*

There's no TVA in ERP. European Aid Administrator Paul Hoffman says he frowns on use of ERP funds for long-range, high cost projects. He prefers to concentrate on less pretentious works (such as aid for existing industrial plants) which will help get Europe on its feet within the 4-plus years scheduled for ERP.

*A second southwestern power system is considering installation of a gas turbine comparable to that which Oklahoma Gas and Electric is undertaking. It may drop the whole idea, though, unless it can tie the new machine into an existing plant and use its exhaust in a reheat cycle.*

Westinghouse is one of the western Pennsylvania manufacturers which is attempting to help solve the natural gas shortage by drilling on its own property. It already has brought in one well producing about 4 percent of its East Pittsburgh requirements.

*One utility got some extra coal during the recent strike through another buyer's cost consciousness. The other buyer, an industrial, would only take coal in open-bottom cars. There weren't enough of these to move the coal he had coming. So the utility agreed to take the remainder in flat-bottom cars.*

*One PUAA ad manager attributes the poor quality of teleshows to the lack of competition between stations.*

# Utility Industry Problems Analyzed at Edison Electric Institute Meeting

GENERAL COMMITTEE meetings opened the Edison Electric Institute's 16th annual convention at Atlantic City this week.

In prefacing the six formal papers which were to be presented in the three-day session, the committee meetings conveyed three principal messages.

**1**—Engineering men were told that the industry's attractiveness to college graduates is improving, but that more progress must be made.

**2**—Commercial men heard a reiteration of the Institute's theme: selling, selling and more selling.

**3**—Accountants were informed of the organization of a new committee to work on the industry's problems arising from its capital expansion program.

Registration was heavy on opening day. It ended with 1748 persons signed. Pre-convention registration was smaller than had been expected—held down perhaps by miserable weather over Atlantic City's holiday weekend. But the Convention Hall auditorium, as EEI President Oakes opened the program, seemed to hold a larger crowd than attended last year's sessions.

Addressing the engineering division general committee meeting, H. K. Breckenridge, vice-president of the West Penn Power Co, declared that engineering graduates and college faculties seem better impressed with the power industry now than they did a year ago.

Utility recruiters, he said, are able to show students and faculties that the industry's expansion program offers promising careers. This fact, plus the feeling that careers in aviation and electronics have been oversold, are partially responsible for today's change in favor of the industry, Breckenridge said.

Emphasizing the dimensions of the remaining job, Breckenridge summarized the findings of a report made recently by EEI's industrial relations committee and the engineering general committee. This called on the industry to:

**1**—Study job needs more carefully before attempting recruiting.

**2**—Adopt better recruiting practices.

**3**—Institute training programs for cadet engineers.

Indicative of the fact that recruiting troubles are not yet over is found in this year's results, Breckenridge said. These show companies getting only 50 to 75% of this year's requirements—so far. Utility salaries, although adjusted somewhat, still are low for top engineering graduates, he said.

**L. V. SUTTON,** president of the Carolina Power & Light Co, was happy to wield a shovel to start construction of a 120,000-hp steam electric generating station near Lumberton, N. C. In the background are other participants in the ceremony: Congressman J. Bayard Clark, left; Rev. R. L. Alexander; Ingram P. Hedgpeth, president of the Lumberton Chamber of Commerce; and H. E. Stacy, vice-president of the Lumberton Chamber of Commerce

Selling can never begin too soon. That was the theme which ran through all the comments at the commercial division general committee meeting.

Duquesne Light Co's J. S. Schuchert observed that utilities probably will have capacity to spare before they get fully into the swing of selling planned lighting. Lighting fixtures, he said, are easy to get today and are being sold. If the industry doesn't see that they are sold for good lighting, he said, it will find they are being sold for poor lighting.

### Describe Education Program

West Penn's Harry Restofski, chairman of the Better-Light Better-Sight Bureau, described the educational program on lighting which has been completed by the Bureau for use in fifth and sixth grade class rooms.

J. R. Hartman, vice-president of Cincinnati Gas & Electric, warned that the power sales "recess" during the last war must be overcome. Contracts, he said, come as a result of long, careful selling—not from single calls.

Pennsylvania Power & Light's J. M. Steedman declared that if diesel competition were making the inroads on commercial and industrial customers that it is making in residential and rural service, utilities would be up in arms. He noted that other competition is effective, too, since even though last year was a record year for electric range sales, LP bottled gas ranges outsold them.

An installation manual for water heaters is being distributed and one for ranges is being prepared, R. F. Hartenstein, of Ohio Edison, told the meeting. Meanwhile, cooperation between EEI and The National Adequate Wiring Bureau is bearing fruit.

### New Accounting Committee

The accounting division's general committee meeting heard the announcement of a new committee on capital expansion problems after an address by Harold Scaff, vice president of Ebasco Services, Inc. Scaff pointed out that utility common stocks have lost attractiveness to investors because of the size of the expansion program and the impact of cost increases on net earnings. But the expansion, he said, will help the industry by producing greater revenue and cutting unit costs.

Leonard Spacek, partner in Arthur Anderson & Co, Chicago, urged utilities to make their annual reports more easily understood. Too much technical accounting language now adorns these reports he said. Simplified terms and simplified statements would assist investors, he said.

Later this week, two awards were to

be made. A 10-man line crew of the Georgia Power & Light Co, St. Petersburg, Fla, was to receive the Claude L. Matthews award for valor. Its foreman, J. A. Pollock, was to receive the award for his men, who earned it in preventing the destruction by fire of a transmission line serving six Georgia communities. The men climbed burning poles and then played hoses on the poles and crossarms to extinguish fires which threatened the line. The poles had been fired by a blaze in a crete mill which adjoined the line. It carried 22 kv and 2.3 kv circuits. The deed was done last June 25, at West Bainbridge, Ga.

For the second successive year the annual award for the electric light and power company producing the best annual report was won by Union Electric Co of Missouri, J. W. McAfee, president. This contest has been sponsored for a number of years by the Reddy Kilowatt Service, advertising and public relations agency in the electric industry. The prize is a bronze plaque which states that the award was presented to that company "for its annual report for the year 1947 which so splendidly illustrates humaneness and simplifies to stockholders the company's operations."

Honorable mention went to Puget Sound Power & Light Co, San Diego Gas & Electric Co and Wisconsin Power & Light Co. Special mention went to Washington Water Power Co and Utah Power & Light Co.

The judges were: Merryle S. Rukeyser, economic analyst and financial writer, New York, George C. Tenney, vice-president, McGraw-Hill Publishing Co and acting editor Electrical World and Tom P. Walker, vice-president, Irving Trust Co, New York.

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## Third 65,000-Kw Unit

Duquesne Light Co will add a third 65,000-kw unit to its Phillips Station, located on the Ohio River at South Heights, Pa. The unit is to go into operation in January, 1951. A second unit of the same size, now under construction, is to go on the line in November, 1949. Coal will be used for fuel. Operating steam pressure for both units will be 850 psi and 900 F.

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## Ed Fleischmann Opens Office

Edwin Fleischmann, consulting engineer, of Palo Alto, Calif., has opened an office at 1111 West Coast Bldg. 605 Market St, San Francisco 5, Calif. Mr Fleischmann is planning to retain his Palo Alto office.

# Illinois Commission Keeps Control of Chicago Rates under Franchise

THE "ADJUSTMENT BOARD" which is set up under Chicago's new franchise ordinance will not in any way conflict with the jurisdiction of the Illinois Commerce Commission.

The board will have no jurisdiction over Commonwealth Edison's rates or charges and may only be called into existence under carefully stipulated circumstances. Its functions will be two:

1. To determine specific amounts of money involved in any of several categories wherein the city and the company might fall into dispute.

2. To consider and recommend, no more often than once every five years, then only at the request of the city or the company, what changes might properly be made in the franchise ordinance.

These were the salient points in a description of the new adjustment board given to ELECTRICAL WORLD last week (May 28) by a Chicago official.

ELECTRICAL WORLD declared incorrectly in its May 29 issue that:

1. The new board is a "rate adjustment board." It is not.

2. That the new board will "adjust rates yearly." It will not.

This spokesman declared that the board would be called into existence—by city or company—only from time to time, as need for it arose. It would, he added, determine the amounts of money involved in the event of disagreement upon any of the following:

1. "Cost of the provision of electric energy."

2. "Undepreciated capital employed in the production of electric energy."

3. "Cost of reproduction new and depreciation."

4. "Fair corporate earnings."

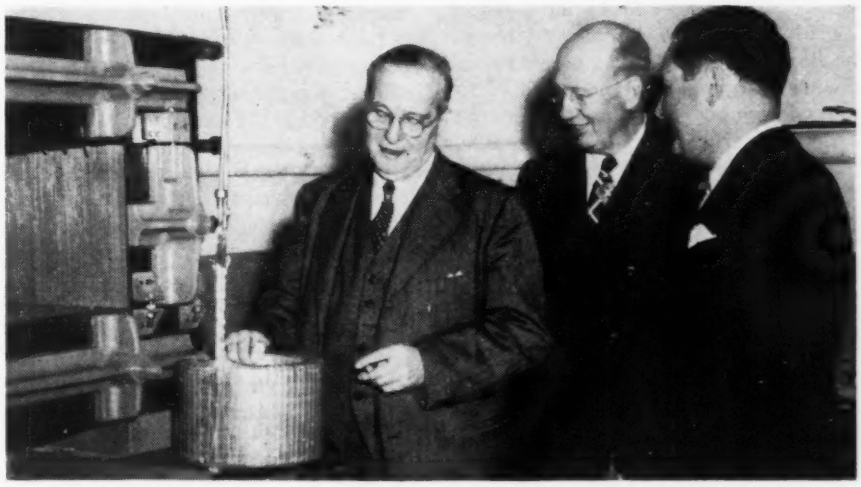
5. "A reasonable return."

6. "Prospective changes in revenues and costs."

The spokesman added that each of these terms is defined carefully in the franchise ordinance. Thus, he went on, the adjustment board's duty would be a narrow one, confined solely to ascertaining certain disputed amounts. It would not include defining what should be considered in ascertaining such amounts.

The board, he went on, has one other field in which to operate, but it is limited to use at five-year intervals. At such times, either party to the franchise contract can re-open it to consider effects of changes in law, public regulation, economic conditions, or the art or method of providing electric service.

With regard to rate changes, this spokesman pointed out that the company, if its return during a given year is unreasonable or unfair, may be required to file new rate schedules with the Illinois Commission. Conversely, if its return is unreasonably low, it may seek relief from the Illinois Commission. With neither of these operations has the city adjustment board any relation at all, it was emphasized. The only possibility which might arise whereby the adjustment board might become involved in a rate matter would be if a



**INAUGURATION** of Dr T. Keith Glennan as fourth president of Case Institute of Technology attracted many visitors. Many of these were interested in Betatron Unit being constructed for study of atomic energy. Here inspecting a portion of the machine are Dr. Hugh S. Taylor, left, dean, graduate studies, Princeton University; Oliver E. Buckley, president, Bell Telephone Laboratories, Inc; and President Glennan

dispute arose as to the validity of certain figures entering a rate dispute. In that event, either party might ask the board to determine exactly what those figures are. And on the board's finding, either party might decide to oppose or not to oppose a rate change.

The spokesman pointed out that ELECTRICAL WORLD erred on one other point in its May 29 story. This was in regard to the franchise point which limits the annual expenditure by Commonwealth for changes from overhead to underground construction to $1,000,000. The reason for this limitation, he said, was because there has long been complaint in Chicago against the high cost of underground construction. Because the complaint has been so bitter and so continuous, this spokeman said, it was decided to limit the amount which might be performed in any given year.

Under the law, the mayor has until the next Council meeting, June 11, to accept or veto the franchise ordinance. If he has not acted at that time, it will become effective, this spokesman said. Thereafter, the company will have 30 days, dating from its acceptance, to determine whether it wants to accept the franchise. It was understood the mayor has been under heavy pressure to veto the franchise.

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## Bureau of Reclamation to Hire Student Engineers

About 400 engineering students attending universities in Oregon, Washington, and Idaho will be given full or summertime employment on Bureau of Reclamation projects in the Pacific Northwest this year.

Because of the heavy construction schedule and the necessity for a reservoir of trained professional engineers, the Bureau is undertaking an Engineer Trainee Program. Students in their sophomore and junior years may be employed during the summer months, given on-the-job training, and upon graduation go right into professional engineering positions.

Employment offered will be in all branches of engineering, but particularly in electrical, civil, mechanical, and general.

A nation-wide examination for permanent appointment to the position of engineering trainee in the Bureau, at salaries ranging from $2,200 to $2,400 per annum is contemplated.

The Bureau is seeking to employ on a fulltime basis about 100 engineers at the P-1 rating, $2,650 per annum, and about 35 at the P-2 rating, $3,400 per annum.

**ASSEMBLYING** the high-pressure end of the 40,000-kw General Electric Co turbogenerator which is being installed in addition to Miami Station of Florida Power & Light Co

# Motor Pioneers Feted By NEMA Forty Years After Organizing

PIONEERS of the electric motor industry were honored this week (June 1) at a banquet given by NEMA's Motor and Generator Section, at Hot Spring, Va.

Forty years after the industry's first motor makers' association was organized at Hot Springs, 18 of the original group returned.

Acting Editor George Tenney, of ELECTRICAL WORLD, addressed the anniversary celebration. Using recorded excerpts of the speeches and writing of the industry's pioneers, Tenney took his audience back and forth across the years.

Motor manufacturers had problems two score years ago, it seems. One recording complained of the inadequate return on the "money and brains invested" in motor manufacture. The complaint, Tenney declared, is not unheard of today. Government intrusion into the operations of industry was the theme of another old-timer's recording. How it has flowered since, Tenney noted.

In reviewing the forty years of motor manufacturing, Tenney noted that the industry had contributed phenomenally to the advancement of industry and home life as well.

"In 1909," he observed, "the American worker had 2.5 hp at his command. Last year, he had 7.25 hp to work for him. In 1909, industry was 30 percent electrified. Last year, it drew 84 percent of its energy from electrical sources. During these years, output per worker has tripled. The goods and services he can buy with an hour's work has doubled. Largely, this is due to the electrification of industry which has been made possible through the development of effective electric motors."

One industry pioneer predicted early in the 1900's that, if the industry labored with diligence and foresight, the year would come when 1,000.000 motors would enter the American home. In 1947, Tenney declared, 15,000,000 motors did so. The motor load in homes today, he went on, is greater than the industrial load was in 1908. Through it all, he said, the effects of motor development have been accumulative. Application of electric motors in industry made possible the production which enabled the electrification of the home. This in turn opened vast new industrial markets. The spiral, he said, has not ended yet, but it has already given the United States a living standard which is the envy of the world.

Two men who were among those meeting at Hot Springs 40 years ago are still active in the industry. They are R. J. Russell, vice president and secretary of the Century Electric Co, and Clarence L. Collens, chairman of the board of the Reliance Electric & Engineering Co and a member of NEMA's board of governors.

Other survivors of the original group are J. W. Ham, General Electric; F.

**FRANK COPITHORNE,** left, British Columbia Electric Railway Co, Section vice-chairman, and J. E. Winton, Washington Water Power Co, Section chairman, at meeting of Accounting and Business Practice Section of Northwest Electric Light & Power Association

S. Hartman, then with Northern Electric Manufacturing, later with GE; C. H. Roth. Roth Brothers & Co, later absorbed by Century Electric; E. F. Davidson, Rochester Electric Motor Co, now the Electric Products Co; J. C. McQuiston, Westinghouse; A. L. Doremus, Crocker-Wheeler; F. E. Hunting, then with Ft. Wayne Electric Works, later with GE and then Chairman of the board of Robbins & Myers; S. L. Nicholson, Westinghouse; J. B. Milliken and Rodman Gilder, Crocker-Wheeler; W. A. Layman and A. H. Timmerman, Wagner Electric Manufacturing Co; W. B. Elliott, C&C Electric Co, later absorbed by Burke Electric Co; C. H. Chalmers, Electric Machinery Manufacturing Co; L. J. Osborne, Fairbanks, Morse & Co; and D. C. Durland, president and chairman of the board of the Canadian General Electric Co. Ltd, who then represented the old Sprague Electric Co.

The group they organized then was known as the American Association of Electric Motor Manufacturers. Two years later, it was succeeded by the Electric Power Club. In 1926, the club was merged with the Associated Manufacturers of Electrical Supplies into NEMA. For 10 years before the merger, activities of the two groups had been coordinated through the Electrical Manufacturers Council, which was dissolved when NEMA was born.

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## CEMA to Move Offices

Canadian Electrical Manufacturers Association will move on June 12 to new headquarters at 126 Davenport Road at Belmont, Toronto 5.

## Earnings, Financing Are Major Industry Task

Obtaining the capital necessary for plant expansion and maintaining net earnings in the face of static rates and mounting costs are the biggest jobs the electric utility industry faces.

This was the burden of an address by President Kinsey M. Robinson, of the Washington Water Power Co, before a recent meeting of the Northwest Electric Light and Power Association's Accounting and Business Practice Section. The meetings was held at Spokane.

Robinson said private utilities in the Pacific Northwest have 500,000 kw of new capacity under construction. But he added that these machines, with the new units at Grand Coulee will do scarcely more than meet anticipated load growth. Thus, Robinson said, adequate reserves in the region are not to be anticipated until after 1951, depending upon how fast McNary dam can be completed.

A. William Morris, Spokane tax consultant, warned that existing tax laws make the job of raising risk capital for utility expansion harder than it has to be.

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## Utility Will Raise Pay 8%

Pennsylvania Power & Light Co and the Employees Independent Association have agreed on an 8% wage increase effective June 1. About 5,400 non-supervisory employees will benefit if the union membership ratifies the agreement.

## Northwest Floods Spread Ruin; Emergency Called

Flood waters, resulting from the melting of the heavy snow in the mountains, is spreading a steadily increasing path of destruction in the Pacific Northwest, as ELECTRICAL WORLD goes to press. Swollen streams have driven thousands from their homes. Rivers tore loose dikes, protecting some 50,000 acres in various centers. Losses will run into millions.

### Disaster Area—Truman

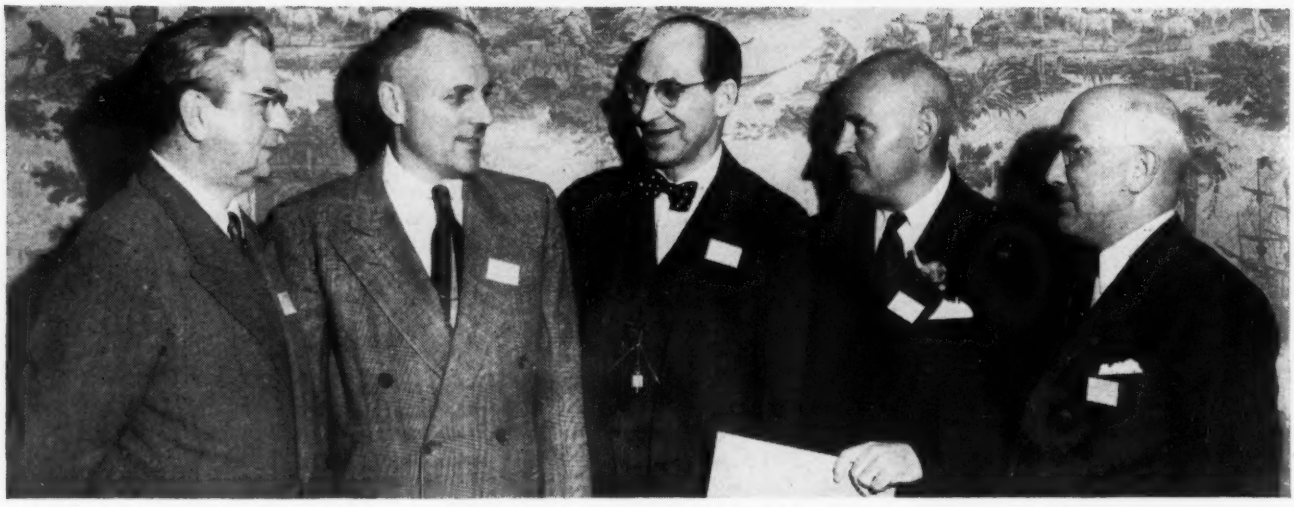
President Truman authorized use of war surplus property for relief and rehabilitation in the flood sections, declaring the territory a "disaster area." In addition, Mr Truman authorized the use of Army and Navy materials.

Gov. Mon C. Wallgren of Washington declared a state of emergency and Gov. C. A. Robbins proclaimed an emergency in the 10 northern counties of Idaho. The situation in eastern Washington, northern Oregon, northern Idaho, western Montana and British Columbia was described by the Red Cross as a "regional disaster." In British Columbia the Canadian Militia was mobilized to aid the swelling number of refugees in the Fraser River valley from its mouth near Vancouver, B. C., to Agassiz 73 miles to the east.

An outstanding development in the disaster is a power shortage in the Northwest network, with the possibility of further shortage foreseen. Private power companies and municipals throughout flooded Washington and northern Oregon, agreed on a limited "brown-out" from 7 a.m. until noon and from 8 p.m. to 10 p.m., effective June 1, to meet the growing shortage. Power output from Grand Coulee and Bonneville was off approximately 30% early this week. Hundreds of miles of light and telephone wires are down indefinitely, communication in some areas being restricted to radio.

### Vanport City Destroyed

Both the Columbia and Willamette Rivers are far out of banks. All along the Columbia, Oregon and Washington residents and stock were evacuated. Scores of industries were shut dowr and stock moved to high ground. Portland was virtually isolated, with a large area of its industrial area flooded by the cresting Willamette. Rising waters short circuited electric cables of the Morrison Street Bridge in that city, which went out of service. Warbuilt Vanport City, five miles north of Portland, was completely destroyed with considerable loss of life when a break through a dike inundated the town under 15 ft of water. Yakima, Wash., was hit by a storm.



**ON PUAA PROGRAM** at Cleveland convention were Frank J. Ryan, left, Cleveland Electric Illuminating Co; Herbert Briggs, incoming PUAA president; A. L. Billingsley, speaker; Elmer L. Lindseth, president of Cleveland Electric; and H. S. Metcalfe, retiring PUAA president

# Advertising Managers Emphasize Cooperation with Top Management

WITH CLOSER cooperation between top management and advertising managers as its goal, the Public Utilities Advertising Association held its annual convention last week at Cleveland. The majority of the 151 delegates were employees of electric utilities of which most of the larger companies were represented.

As the first step toward its goal, the group heard an address by Elmer L. Lindseth, president of Cleveland Electric Illuminating Co, on "What the Utility President Expects from the Advertising Manager." In similar vein, John J. Quinn, vice-president, Boston Consolidated Gas Co, spoke on "How the Utility Advertising Manager Can Be Most Valuable to His Company."

Other topics of discussion were how to meet the rising cost of advertising production, how to make employee publications more interesting, and ways of explaining inadequate power supply to the public without losing good will for the company.

Herbert Briggs, Jr., advertising manager of the Philadelphia Co, Pittsburgh, was elected president. Other officers elected were Floyd I. Fairman, Kentucky Utilities Co, first vice-president; William B. Hewson, Brooklyn Union Gas Co, second vice-president; John E. Canfield, Wisconsin Power & Light Co, third vice-president; Charles D. Lyon, Potomac Edison Co, secretary; and Mead Schenck, Interstate Power Co, treasurer.

C. Fred Westin, Public Service Electric & Gas Co, Newark, was named editor of the "PUAA Bulletin." He will continue to direct the group's advertising exchange which is designed to promote better advertising copy and to cut cost of advertising preparation and production.

Lindseth in his address cited three paramount pressing problems faced by the utility industry today. These are to obtain billions of dollars for financing, to secure rate increases to assure the best service at a profit, and to attract higher quality of manpower. The question he asked was "how are advertising managers going to solve these problems?" His question he left with the group to answer.

However, he did define the ideal advertising manager as one who "recognizes that advertising—like accounting or law—is a primary function of utility operation; and that through adequate performance of this function, he can make a maximum contribution in the field of top management."

"No activity of the company should ever be closed to the advertising manager," Quinn asserted. "He should be advised on all company management policies, plans, procedures, and results. His opinion and advice should be solicited and thoughtfully considered before policy changes are decided upon. If he has the ability to feel the public pulse, he can make a valuable contribution to management when policy changes affecting public interest have to be determined. So far as practical, information should come to him first hand from responsible management executives."

The advertising manager becomes most valuable to his company when he recognizes his broad opportunity for service to his company, its investors, employees, and the public, and approaches the discharge of these responsibilities through the development of executive leadership, with initiative and an understanding of human nature playing an important part, Quinn concluded.

Need for better understanding of each others aims and problems among management, employees, and the public, was emphasized by Allen L. Billingsley, president, Fuller & Smith & Ross, Inc. This need is brought about by the bigness of today's business. Personal relationship has disappeared among the three groups. The job of public relations is to substitute for this loss.

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## '48 Better Copy Awards Announced by PUAA

Winners of the 1948 Better Copy Contest of the PUAA were announced last week.

Companies were classified according to the number of customers served. Group A included companies with less than 100,000 customers; B, 100,000 to 300,000; C, over 300,000.

Electric utility winners were:

Series of five or more newspaper advertisements—Group A, Iowa Southern Utilities Co; Group B, Portland General Electric Co; Group C, Philadelphia Electric Co.

Single newspaper advertisement on a public relations subject—A, Tampa Electric Co; B, Utah Power & Light Co; C, Philadelphia Electric Co.

Single newspaper advertisement promoting electric service—A, Tampa Electric Co; B, Narragansett Electric Co; C, Northern States Power Co.

Employee publications—A, Washington Water Power Co; B, United Illuminating Co; C, Union Electric Co of Missouri.

Material sent to residential consu-

mers—A, Weymouth Light & Power Co; B, Public Service Co of Colorado; C, Northern Indiana Public Service Co.

Special booklets — A, Interstate Power Co; B, Public Service Co of Colorado; C, New York State Electric & Gas Co.

Window display—B, United Illuminating Co; C, Philadelphia Electric Co.

Inside display—A, Washington Water Power Co; B, New Orleans Public Service; C, Cincinnati Gas & Electric Co.

Outdoor advertising — B, Dallas Power & Light Co; C, Pacific Gas & Electric Co.

Annual report to stockholders—A, Arkansas-Missouri Power Co; B, Houston Lighting & Power Co; C, New York State Electric & Gas Corp.

Complete programs—A, Empire District Electric Co; B, Indianapolis Power & Light Co; C, Duquesne Light Co.

Films—Connecticut Light & Power Co.

Radio advertising—Union Electric Co of Missouri.

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## Employer Can Denounce Labor Union to Workers

It's no longer an unfair labor practice for an employer to require his employees to listen to anti-union speeches on company time. However, he cannot promise them any benefits for following his advice, nor threaten them with reprisal or force.

This is the ruling made by the National Labor Relations Board, May 17, on a complaint brought against the Babcock & Wilcox Co, Augusta, Ga., by the United Stone & Allied Product Workers of America, CIO.

On four occasions before a bargaining election, the union charged, the plant superintendent got the employees together and made an "anti-union" speech. The union lost the election and brought charges against the company for unfair labor practices.

The NLRB in making its ruling followed the Taft-Hartley Act. Under the Wagner Act, an opposite ruling had been made in a similar case.

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## Spokane Ousting D-C

Direct current is vanishing from Spokane. The Washington Water Power Co has shut down its last 600-v d-c generators. They had been kept in operation since 1930 only to serve a few elevators. Now these have been converted to a-c operation. About a dozen buildings in downtown Spokane are still using 240-v dc.

## Los Angeles Enters Race for Kings River Sites

The City of Los Angeles is the latest starter in the race for hydroelectric development sites on California's Kings River and its tributaries. The city's Board of Water and Power Commissioners now is reported to be completing detailed plans for six reservoirs and five power plants in the area.

The city recently filed an application for a preliminary permit for this project with the Federal Power Commission. The application, obviously the forerunner of a more detailed request for a federal license, called principally for development of the middle and south forks of the stream.

The city proposed construction of two dams and a power plant on the middle fork, three dams and two power plants on the south fork, and a dam and power plant above the junction of those streams on Kings River. Capacity of the power installations was not reported.

The proposed Kings River Dam apparently would conflict with a project for which license already has been sought by Francis N. Dlouhy, a private citizen of Los Angeles. Status of the Dlouhy project, however, has been unclear since he withdrew from the public hearings held May 17-26 in Fresno by FPC. At that time, Dlouhy reported that he would amend his application.

FPC is not expected to issue any order concerning Kings River in the near future. At the Fresno hearing representatives of the Pacific Gas & Electric Co, the Army Engineers and the Bureau of Reclamation testified on their plans for developing the stream and its north fork. The commission allowed the interested parties a total of 90 days after the close of the hearing in which to file further briefs and replies.

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## Rowen Sworn In; Fills Last Vacancy on SEC

Paul R. Rowen was sworn in Friday, May 28, as a member of the Securities & Exchange Commission, filling the last vacancy on the five-man board. He will complete the unexpired term, ending June 5, 1950, of former Chairman James J. Caffrey, who resigned last year.

A veteran member of the SEC staff, Rowen headed the Commission's regional office in Boston at the time of his appointment by President Truman last February. His nomination languished before a Senate committee until May 25, when the group suddenly approved it. Confirmation by the Senate followed the next day.

The commission now has three Democratic and two Republican members. Besides Rowen, the Democrats are Chairman Edmond M. Hanrahan and Robert K. McConnaughey. The Republicans are Richard B. McEntire and Harry A. McDonald.

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## Supply of Meter Jewels Reported as Improved

A marked improvement in the supply of jewels for watthour meters was reported last week. The report was made at the joint meeting of the meter committees of the Edison Electric Institute and the Association of Edison Illuminating Companies, May 24-26, at Lafayette, Ind.

Synthetic sapphire supply by Linde Air Products is being fabricated into cup jewels by H. M. Gatti, Inc, at a rate recently stepped up to more than 50,000 per month. Gatti added that support for a further quadrupled output should afford a competitive setup.

### Seemann Asks Cooperation

A. K. Seemann of Linde asked the utility industry to cooperate by giving assurances toward averting another hectic period of severe pinch which followed when the war cut off imports. Ed Cornely of Eastern Specialty had reported steady improvement in the availability of imported jewels.

To further ease the jewel situation of the future, General Electric Co announced its new type meter with magnetic suspension and no jeweled bearings (EW, May 29, p 6). This and other novel features (detailed elsewhere in this issue) came as a surprise disclosure to committee members. Deliveries from the new production plant are planned to begin in September.

Survey of color-code practices for meter wiring and test switches brought out a complete lack of standardization but discussion indicated doubt whether there was prospect of going beyond the NEMA specifications for control wiring. There was somewhat stronger desire to standardize the test switches and to confine the wiring color scheme to market uniformity. TW and neoprene-jacketed rubber wires had adherents in the same discussion.

What to do about sockets, A-bases and enclosures furnished by the customers after deterioration is manifest was a moot question. Policies vary widely because of local factors.

New 15-kv through-type porcelain-insulated current transformers (1,000-2,500 amp) with 95 kv impulse strength were announced by E. C. Wentz of Westinghouse. Also mentioned was a multi-ratio auxiliary current transformer and a new precision C. T. Industry

socket production of 300,000 per month is cutting into the 2,000,000 orders still unsatisfied according to L. C. Blevins of the same company.

Ernest Johansson of Anchor Mfg. showed a simple vinylite "glove" to fit over socket prongs and insulate them from the jaws for service lockouts.

Open-house inspection of the plant of Duncan Electric, the host company for the meeting, was taken advantage of by practically all the 125 in attendance at the sessions.

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## More Power for Arizona So Brownout Is Eased

A pledge of additional power from Hoover and Parker Dams has resulted in Arizona curtailing plans for a statewide brownout to include only Pinal County farmers and to limit Phoenix office building cooling to 85 degrees.

The decision was announced by M. J. Dougherty, chairman of the Arizona Power Authority, after M. M. McIntire, chief of power operations and maintenance for the U. S. Bureau of Reclamation, told a conference of Arizona power officials that unanticipated runoff from the Rockies promised to fill Lake Mead and increase power-generating facilities at both Hoover and Parker Dams.

McIntire said most of the additional power would be made available to Arizona because of its desperate situation. He said increased allotments would amount to about 40,000 kw and be jumped to 50,000 June through September.

Because of the low reservoir storage, there has been a deficiency in fulfilling existing Parker contracts of about 20,000 kw, so the surplus will amount to only 20,000 and 30,000 kw.

Power officials stressed that an Arizona brownout would have done little toward relieving shortages. The state's power peak is in the daytime and a curb on lighting would not divert an appreciable amount of power to the huge irrigation pumps.

The proposal for drastic restrictions on air conditioning had received a dour reception and power officials were happy enough to sidetrack the issue by requesting that cooling be limited to 85 degrees.

After pledging cooperation to a prior cooling reduction, merchants discovered the plan also included a complete shutdown of cooling plants on Saturdays and there was strong resentment.

The promise of additional Colorado River power was welcomed by Pinal County farmers who had been cut to three hours a day, three days a week. Under the new setup, they have been promised service five days a week.

## Rural Power Job Done By End of '51-Oakes

Three and one-half years more will see "practical completion" of this country's rural electrification job, E.E.I. President Charles E. Oakes said last week (May 26).

"Work now in progress or definitely planned will connect an additional 1,330,000 rural dwellings to power lines by the end of that year," Oakes declared.

Oakes' statement was keyed to rural dwellings, as opposed to farms. He found that, at the end of 1947, 82% of the occupied rural dwellings in the country were being served. Another 1,300,000 at that time had power available but were not using it. On that basis, he said, 90% of all occupied rural dwellings were served. Of these, he said, utility companies served 10,600,000, REA cooperatives 2,030,000 and 300,000 were served by municipal or other government systems. Rural dwellings, the E.E.I. president added, include not only those on farms but also those in communities of less than 2,500 population and dwellings just outside town limits. Of the 15,800,000 such dwellings, he said, 9,000,000 are rural non-farm dwellings, the remainder farm dwellings.

Slightly more than 100,000 isolated farms are served by home lighting plants. Another 400,000 are considered to be so isolated as to be beyond feasible reach of power lines.

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## Power to American Area in Korea Shut Off by Reds

Don't try to pay your electric bill with chocolate syrup, peanuts, or tobacco—at least not if the Russians are running your electric utility. At least that's the way the Russians claimed the American administration of Southern Korea has been trying to pay its electric bill of $6,000,000. So the Russian-controlled government in North Korea shut off all power to the American area.

Lt Gen John R. Hodge denied the accusation and said the Americans are ready to pay cash but that the Russians wanted electrical equipment. When he wanted to negotiate with the Russians they turned the matter over to the North Korean People's Committee which the Americans refuse to recognize.

In the meantime, the American sector, which had been getting 55% of its power from the Russian sector, is getting an almost normal supply of power. It has three hydro and three thermal stations and two Navy barges.

# SEC RULINGS

NORTHERN STATES POWER CO (Minn.) has been authorized to buy from the Mendota Light & Power Co the street lighting system in Mendota, Minn., and other assets. (Release No. 8195).

KANSAS GAS & ELECTRIC CO has been directed to proceed with the public sale of 150,000 shares of its common stock on a privately negotiated underwriting basis. The stock is held by the American Power & Light Co. An American Power & Light common stockholders committee asked without success that sale of the Kansas Gas stock should not be allowed until Kansas Gas had refinanced its 7 percent and $6 preferred stocks and placed in operation certain generating facilities now planned or under construction. (Release No. 8199).

MISSISSIPPI POWER & LIGHT CO has been permitted to issue and sell to Electric Power & Light Corp 400,000 additional shares of Mississippi common stock for $4,000,000 cash. Mississippi Power & Light is a subsidiary of Electric Power & Light. Money from the sale will be used for construction and improvements. All of Mississippi's outstanding 950,000 shares of common stock are owned by Electric Power. (Release No. 8211).

UNION ELECTRIC CO's proposed sale of $25,000,000 of debentures due in 1968 has been approved. Union Electric is a subsidiary of North American Co. The bonds will be sold at competitive bidding. Union proposes to use the money for construction, for payment of $3,000,000 of short-term bank loans and to buy up to $18,000,000 of additional shares of its subsidiary, Union Electric Power Co. (Release No. 8215).

# MEETINGS

### PREVIOUSLY LISTED

*Northwest Electric Light & Power Association*—Personnel Section and Safety Conference, Medford Hotel, Medford, Ore., June 9-11.

*Pennsylvania Electric Association*—Prime Movers Committee, Hotel Casey, Scranton, June 10-11.

*Arkansas Utilities Association*—Annual Convention, Arlington Hotel, Hot Springs, Ark., June 14-15.

*Pacific Coast Electrical Association*—Annual Meeting, Fairmont Hotel, San Francisco, June 16-18.

*Canadian Electrical Association*—Annual Convention, Manoir Richlieu, Murray Bay, Province of Quebec, June 16-19.

*American Society for Testing Materials*—Annual Meeting, Book-Cadillac Hotel, Detroit, June 21-25.

*American Institute of Electrical Engineers*—Summer General Meeting, Palace of Fine Arts, Mexico City, Mex., June 21-25.

## Krug Names Eardley Chief Engineer, Power Division

Edward P. Eardley, former engineer for the Rural Electrification Administration, has been appointed Chief Engineer of the Interior Department's Division of Power. He succeeds George W. Hamilton, who resigned late last week.

The appointment was announced by Secretary Krug last week just before the House passed a 1949 Appropriation Bill for Interior without funds for the Power Division. Besides eliminating the $104,610 budget request of the division, the House forbade use of any funds available to the Secretary's office for the power unit. Thus, unless the Senate amends the bill—as it did to save the division last year—it is likely that the division's staff of eight will cease to function after July 1.

A native of Utah, Eardley received his electrical engineering degree from the University of Utah in 1935. He joined REA's Engineering staff in 1941, after serving as City Manager of Burley, Idaho. His last assignment with the lending agency was as REA representative in the Tennessee Valley Authority area, advising REA-financed projects which purchase TVA power.

Hamilton resigned to enter private practice in Washington, D. C., as a consulting engineer. He continued working for the Power Division on a consulting basis, pending replacement.

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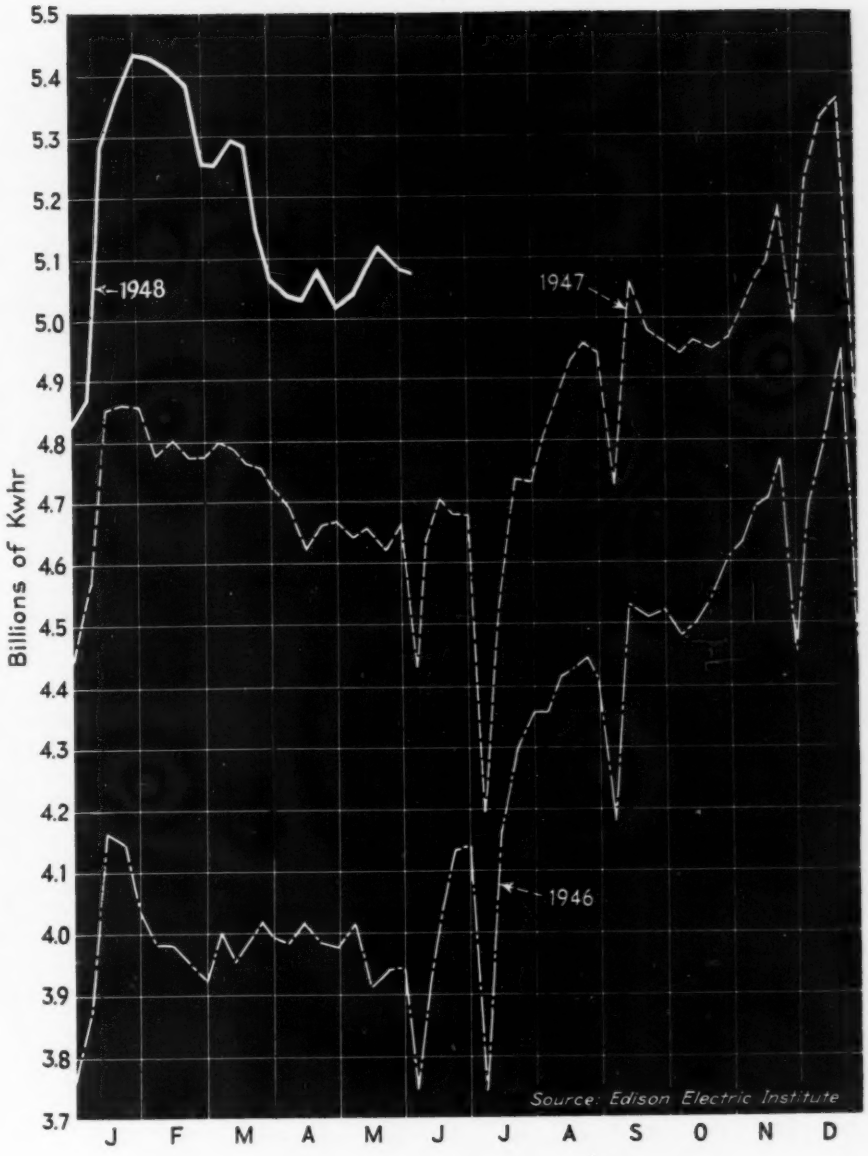
## Canadian Primary Usage Rises but Output Lags

Consumption of primary power in Canada soared to a record high of 3,472,249,000 kwhr in March but total production continued to lag behind that of 1947.

For the first quarter of 1948, total production was 11,017,283,000 kwhr and primary consumption, 10,046,861,000. The corresponding figures for 1947 were 11,397,377,000 and 9,107,266,000 kwhr. Exports to the United States also fell off from 503,074,000 to 363,527,000 kwhr.

The following production statistics, supplied by the Dominion Bureau of Statistics, are in thousands of kilowatt hours:

| Period | 1948 | 1947 |
|---|---|---|
| Three months | 11,017,283 | 11,397,377 |
| Primary | 10,364,989 | 9,460,235 |
| Secondary | 652,294 | 1,937,142 |
| Exports to U. S. | 363,527 | 503,074 |
| March | 3,764,129 | 3,956,905 |
| Primary | 3,577,853 | 3,268,469 |
| Secondary | 186,276 | 688,436 |
| Exports to U. S. | 124,758 | 183,125 |
| February | 3,499,238 | 3,589,361 |
| Primary | 3,277,222 | 2,981,700 |
| Secondary | 222,016 | 607,661 |
| Exports to U. S. | 109,841 | 151,786 |




## Arput Skeptical of Russki Claimski

Soviet news agency Tass puzzles ARPUT by its boasts on Russian inventions. Tass says electric light and welding, radio, steam and jet engines, penicillin, radar and transformers, are Russian inventions. Says ARPUT:

"Can't you just see Edisonovitch and James Wattski tearing their babushkas, Tovarichi? What about Lordei Kelvinopoff? Steinmetzigin was a borscht boy in Odessa, Westinghousenko had a shop in Kiev.

Anything else is lies, LIES, capitalistic fabrications to ensnare the masses in an ever-descending whirlpool of imperalist war, taking them, like the output, down and downski."

### Other News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|---|---|
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**Weekly Output, Millions Kwhr**

| 1948 | 1947 | 1946 |
|---|---|---|
| May 29 5,076 | May 31 4,429 | June 1 3,741 |
| May 22 5,085 | May 24 4,663 | May 25 3,942 |
| May 15 5,109 | May 17 4,616 | May 18 3,934 |
| May 8 5,087 | May 10 4,653 | May 11 3,911 |
| May 1 5,042 | May 3 4,640 | May 4 4,014 |
| Apr. 24 5,027 | Apr. 26 4,668 | Apr. 27 3,977 |
| Apr. 17 5,087 | Apr. 19 4,660 | Apr. 20 3,987 |
| Apr. 10 5,033 | Apr. 12 4,620 | Apr. 13 4,015 |

**Percent Change from Previous Year**

| | May 29 | May 22 | May 15 |
|---|---|---|---|
| New England | +20.5 | + 8.6 | + 8.2 |
| Mid-Atlantic | +15.0 | + 8.3 | +11.1 |
| Central Industrial | +15.2 | + 8.5 | +11.3 |
| West Central | +14.3 | +10.5 | + 9.8 |
| Southern States | +15.5 | +11.4 | +11.6 |
| Rocky Mountain | +15.7 | +10.0 | +12.3 |
| Pacific Coast | + 9.6 | + 6.5 | + 8.1 |
| Total United States | +14.6 | + 9.1 | +10.7 |

# WASHINGTON COMMENT

WILLIAM B. WHICHARD

LENGTHY AS IT WAS, the House debate last week over annual appropriations for the Interior Department lacked much of the heat and color it has generated in previous years. From the press gallery, at least, it appeared that the Department's defenders had accepted defeat at the very outset, especially on Interior's requests for funds for key power activities.

Perhaps it was the unprecedented absence from the proceedings of Minority Leader Rayburn that reduced the effectiveness, if not the spirit, of the public power bloc. In past years, the voice of the Honorable Sam had sounded the rallying note for the champions of any and all power activities of the Department. This year, the former Speaker left Washington—to tour installations in his native Texas, according to Washington aides—before the Interior bill reached the House floor.

The Honorable Sam's interest in Interior's power operations centered upon, but was by no means exclusive to the Southwestern Power Administration. Denison Dam straddles the Red River between Texas and Oklahoma in territory of immediate concern to Rep Rayburn. One terminus and the project's power plant, are in Grayson County, Tex., part of the former Speaker's Fourth Congressional District.

Whenever SPA, as it invariably did, came to Congress for funds to build transmission lines from Denison and elsewhere, Rep Rayburn loaned effective support, particularly when, as he did on one occasion, he found it necessary to step down from the Speaker's chair to enter floor debate. But for his prestige, SPA might have perished for lack of funds at any of several critical points in the past two years.

This year, however, SPA proposed to spend none of the $3,000,000 appropriation it wanted for construction in Rep Rayburn's district or anywhere else in Texas. A spokesman for the agency made that clear during House committee hearings on the bill. The committee promptly eliminated all SPA construction money. And Rep Rayburn decided to go home.

In fairness to the former Speaker, however, it must be recorded that he is facing strenuous opposition for renomination. And, with most of the Republican majority in the House backing the committee's recommendations on appropriations, it is doubtful that even his still-powerful influence could have affected the floor votes on any power items. SPA was particularly vulnerable as, by its own testimony, it has made agreements with one utility which obviate its professed need for much construction, and it has been negotiating for a similar arrangement with other utilities of the area.

Apparently, APA has salted down and put on ice its grandiose plans for a multimillion-dollar power network, complete with steam generating plants and other trappings, which Congress rejected two years ago. It has scarcely mentioned this scheme since. And, for the first time, the other Interior power agencies have learned what it means to their programs to be without the potent voice of the Honorable Sam pleading their cause.

# TECHNICAL TRENDS

ARCHER E. KNOWLTON

**Control room** ceiling in one of the new power plants will be luminous all over. Light sources will be above a continuous plastic ceiling.

**Car shaker control** has passed to the automatic and limit switch stage, expediting the unloading of obstinate coal.

**Tap changing under load** is being applied to about half the new large power transformers. Three-phase bus regulation is in favor.

**Transformer bottoms** are usually not too accessible for protective painting. Perhaps those areas merit a superior defense against corrosion when they leave the factory.

**Equipment reliability** in all categories has been improved so much that the spare unit is less and less in evidence. In addition there are interconnections, back-up protection and mobile equipment for reinforcement and insurance.

**Splash-proof motors,** recent experience shows, will not stand up against hurricane-driven rains. Such exposure falls just short of immersion.

**Not wholly facetious** is the comment that manhole explosions might be less frequent if cable insulation generated no inflammable vapors.

**Progressive standardization** is injecting a new factor in buying—that of weighing the extra costs of the extras to make sure that the extras are worth the extra cost.

**Fault-current** has components of different phase angle and different rate of change than "pick-up" motor current. If desirable either conceivably could be the basis for a discriminating relay.

**Standard impedance** for network transformers is now 5 percent. In some instances 5 percent external reactance can probably be added for less money than is spent for inbuilt reactance; the reverse also has been experienced.

# It's Time To Start Fighting

CHARLES E. OAKES, President, Edison Electric Institute

*Because of the importance we attach to it, we present here in full the final third of Mr Oakes' presidential address instead of an abstract of the whole. He points out that while, in the main, power companies are independent and local in their operations, they are interdependent and national as an industry. Against attacks on the national front, they must defend themselves in national terms.—The editors.*

WE ARE CONFRONTED with a battle for men's minds; a struggle to prevent communism from overwhelming us from within or imposing its will upon us from without. We must win this conflict of ideologies cleanly and decisively. Defeat means the end of our liberties. A half-way or compromise victory may result in far reaching and detrimental changes in our economic system and our way of life.

This complex and bewildering situation is a challenge to everyone of us to do our full duty and more, to think clearly, and to hold steadfast to the principles upon which our nation was founded, and which have guided us to our present position of strength, freedom and material prosperity. The challenge is especially great to the utilities. Adequate electricity is essential in peace; it is of vital necessity in war. The utilities must provide it in abundance. If they do not, the Federal Government must take over the job.

Socialization of electricity is the very cornerstone of communism and its ilk. Thus the utilities are in the forefront of the battle against statism. Some companies have already been lost. Others are in the midst of the struggle. Still others, while presently somewhat removed from actual contact, will, if socialization of our industry continues, be drawn into the maelstrom as it nears their doorsteps. In the end, we will win, lose or draw as an industry, not as companies.

All of us, I am sure, favor flood prevention and reclamation, and that electric generating facilities should be installed at government dams where economically feasible. I believe that the public wants flood control and reclamation. It must be made clear to them that there is no social or economic need for the Federal Government to enter the power business in competition with taxpaying utilities under cover of supplying water to farmers or abating high water. The existing distributors of electric power in the area should market the power from government dams.

CHARLES E. OAKES

**When he talks about government and business, Mr. Oakes knows whereof he speaks. It is from 5 years of government employment by the Bureau of Standards and the Federal Power Commission. That was previous to 1923 when he joined the Pennsylvania Power & Light Co, shortly becoming manager of the Allentown division where he remained for 12 years. In 1939 he was elected president of the Birmingham (Ala) Electric Co, returning to Allentown as president of PP&L in 1945**

There are several practical ways in which the distributors could handle the marketing task. One of them, or a group, could build the power house and install the generating equipment at each government dam under FPC license, pay taxes on these facilities, and also pay the government for the falling water and use of the dam. The government in each case would retain full control over the dam, and operate it for its primary purpose of flood control, reclamation or navigation, or a combination of these purposes, as the case may be. This method would afford the greatest relief to the taxpayers, and be of maximum aid to reclamation, flood prevention and control, and navigation.

The government power house and generating facilities could be leased to the local distributors. Or the power could be wholesaled by the government to distributors under long-term contracts without discrimination as to price or conditions.

The regulatory authorities having jurisdiction over the various utilities would, of course, see to it that fees and rates are fair, and that whatever benefits may result are properly distributed and, where applicable, passed on to the consumers.

The vast and widespread program of construction of government dams that is under way and proposed means that under our present laws, socialization of our industry will spread to many sections of the country. There is no need of this happening.

We are in the main, local utilities. But in the economic structure of our country, we are an industry. On national issues and policies, we will be judged by our accomplishments on a national basis. The failure of one utility to do its part hurts every other

utility. A job well done is a boost for all. If we are to meet successfully the challenge of the times, we must think, act and talk as an industry, part and parcel of American life.

If we are to think as an industry, we must broaden our horizons, and revalue what we do in the light of what it may mean to the industry as a whole. We must outline our objectives and policies in our local areas on a national basis. We must keep our aims before us, and shape our courses towards them. Our industry badly needs a cohesive philosophy, a creed, and a unified policy program to guide our actions so that everyone will know where we stand.

#### Must Stand Together

We should take our place beside others who are striving to bring about—

**1**—A full understanding of the adverse sociological effects of government in business, of the withering results of a planned economy, and of the delineation between individual rights and statism.

**2**—The establishment of a sound tax program designed to allow and to encourage the formation of the new capital needed for our free economy.

**3**—The elimination of tax exemption for proprietary businesses, both public and private, and of the other valuable and unfair special privileges enjoyed by government in business at the expense of everyone else.

**4**—Continuance of full responsibility by the utilities of the United States for meeting the present and future electric power requirements of the territory they now serve, and of such other areas to which they can extend their power lines from time to time.

**5**—Improvement of interconnections both with other utilities and with industrial plants by entering into interchange agreements, and otherwise preparing to integrate fully their operations on an area basis, in an even more effective manner than during the past war.

I think we should advocate:—

**1**—The development of the water resources of the nation and the control of floods through projects soundly conceived, well engineered, economically justified and administered so as not to destroy private business, and including, where warranted, the installation of generating facilities to utilize the falling water.

**2**—The promulgation of a constructive power policy by the federal government which would define its functions in relation to the power business, standardize its practices, delimit its activities and stabilize and reassure the industry.

**3**—The marketing by utilities of the power from new government dams by the building of generation and transmission facilities, or by leasing the facilities, or by purchasing the power output under long-term contracts.

**4**—That the industry stand ready to assume the electric power obligation to be surrendered should the Congress decide to halt the growth of any federal power undertaking or to divest the federal government of such responsibility it may have assumed in any area.

**5**—The extension of the authority of existing regulatory bodies to public power, so as to place these government enterprises as nearly as possible under the same rules as the tax-paying utilities.

This industry finds itself today in a position which is truly amazing. Each of us in our local areas is confronted with a vast expansion program to take care of the needs and demands of our customers. We find ourselves facing the greatest need for financing in any period of our history. The industry is today a local industry in every sense of the word. Millions of shares of the securities of operating companies are held by thousands of stockholders and the list is growing larger daily. We have thousands of employees who have joined our ranks during the war and post-war years and who have had no experience in peacetime operation of the business.

There is a great need for public information programs at the local level to inform customers, employees and investors of the policies of the local companies, their plans and prospects for the future, and the interdependence of the utilities and the areas they serve.

At the national level, this industry, in common with other businesses, is facing the problem of a shortage of investment capital due to operation of our income tax laws. We find ourselves subjected, as other industries are, to discriminatory, preferential taxation. There is a lack of public understanding of our accomplishments as an industry in the post-war period and of our plans for the future. We find ourselves, in common with other businesses, but in the forefront, subjected to a drive for the socialization of industry. There is too little public understanding of the operation of the capitalistic system, particularly the benefits derived therefrom by the individual.

We are badly in need of a broad public information program at the grass roots and on a national level. It has been too long delayed. We have an excellent, even inspiring story to tell. Economic facts are on our side. We must demonstrate that electric service by private business is superior and best for the nation. We must join with others to strengthen the opposition to socialism and communism. We must tell and re-tell the fact that business-managed utilities are a vital part of private business and should not be socialized. We cannot hope that the public, busy with its own affairs, will understand our position unless we tell it to them. We must tell our story to every segment of the social and political structure of this nation and do it over and over again. This is the way to make friends for the industry.

#### Must Meet the Challenge

Good service; abundant power; low rates; improved public relations; cooperation with regulatory bodies; security for employees and investors; improved efficiency; engineering advances;—all these we expect to give in full measure.

But we must do more than that in these difficult days. We must work with others to sell and re-sell our capitalistic system and prevent the spread of socialism. We must stand fast to our principles and beliefs as free people.

We can, we must, meet the challenge of these times. We will if we as an industry think straight, act wisely and talk effectively.

# Utilities' Stake In Soil Conservation

H. H. BENNETT, Chief, Soil Conservation, U. S. Department of Agriculture

IT SEEMS TO ME the time has come to speak out with the brutal truth about the land problem in the United States and around the world. First, I want to stress the great need for determined leadership of the kind that really understands the utter dependence of all mankind on the land, sees the practical possibility of improving the land and increasing its productiveness through conservation and senses the advantages of such increased production to everybody.

Another aspect of the hard truth —and not nearly enough people understand this—is that population has either caught up with the food-producing possibilities of a vast area of the earth's surface or is moving rapidly in that direction. In other words, there is not enough land for the world's population under existing methods of food distribution and improper use and protection of the land.

Worldwide, we have less than 2 acres of productive land per person at present. And even this small per capita acreage is shrinking. It is shrinking because the world's population is growing while the area of productive land is becoming less. Land is becoming scarcer because we are still impoverishing or ruining it for further cultivation in all parts of the world. Even here in the United States we are still permitting land to be ruined for any further practical cultivation, mainly because of excessive erosion by wind and water, at an average annual rate of around 500,000 acres.

Two acres of productive land is barely enough to furnish a minimum adequate diet for one person. In fact, most nutritionists seem to feel that about 2½ acres of reasonably productive cultivable land are needed to furnish a minimum nutritional diet for each person. Clearly, then, we cannot afford to waste any more land; we are going to be hard pressed to get along even though we may be able to increase the productivity of all the 4 billion acres the world now has.

**HUGH HAMMOND BENNETT**

**Called the father of modern soil conservation, Mr Bennett is an international authority in that field. Since 1903 he has been a soil scientist. He holds honorary degrees from the University of North Carolina and from Clemson Agricultural College. He is the author of several books on soils and agriculture and is a frequent contributor of material to periodical scientific literature**

Around a fourth of the cropland in this country is being damaged at a critically rapid rate by erosion. This is an area estimated at something like 115 million acres of highly vulnerable cropland, much of which will be permanently damaged and some ruined for further cultivation every year it is cropped without protection. It ought to be adequately protected—and can be—during the next 10 to 15 years.

Our American utilities are showing increasing interest in soil and water conservation, flood control, and in the prevention of sedimentation of our reservoirs and drainage and irrigation ditches. Among other things, utilities develop and handle water power, an activity that is inseparably tied in with the problem of silt prevention. They, like the farmer and the flood control engineer, are deeply interested in holding as much of the rain as possible where it falls, and in controlling the excess —the runoff—all the way down to the oceans.

In our flood control operations, the Soil Conservation Service devotes its efforts largely to lands drained by small streams—the "little waters" of the nation. We have found that the combined damage produced by floods along these lesser streams that drain the uplands—the fields and pastures, the woodlands and all the hills—and find their way into the trunk streams, exceeds the flood damage along the main channels, at least on many of the trunk streams. This fact has been ascertained through our detailed flood control land and water surveys, as well as through our experience in the field.

Utilities have reason to be particularly concerned with the rapid siltation of our reservoirs. About one-third of the nation's electrical power is generated by hydroelectric installations. Silt is seriously reducing the capacity of many storage reservoirs to maintain a high rate of firm power production.

The point I want to make is that utilities not only have a vital stake in the broad public aspects of soil conservation, but they have a direct financial interest in the control of erosion on the watersheds supplying the runoff that fills the hundreds of hydroelectric power reservoirs throughout the country.

# Selective Selling Is Needed Now

**GEORGE E. WHITWELL,** Vice-President in Charge of Sales, Philadelphia Electric Co

SELECTIVE SELLING should be a tool which is constantly being sharpened in order that it may be ready at any time for increased use. The future, whether it continues to be one of great demand for our product or one that involves recession or even depression, will require production and sale of many more kilowatthours than those which our customers will just take from us.

I cannot but feel that top utility management has a definite obligation to recognize the need for well-directed and intelligently planned selling consistent with each local condition and to see to it that the industry does not lose sight of this need.

The two biggest residential markets are water heating and cooking. Control in selling these two devices can go so far as to add them to the utility's lines in some ratio such as two ranges to one water heater which, in a territory with which I am familiar, produces the maximum return on investment.

### Biggest Residential Market

On the other hand, where conditions warrant, more sales emphasis can be shifted to water heating which, served off-peak, presents no production capacity problem and distribution problems that are relatively minor. At the same time, a profitable market is built that can be most important in the future. Potentially it is much the biggest residential market that utilities have and it squeezes more kilowatthours and more revenue for the future with very little effect on present load.

Among commercial customers major emphasis can be concentrated on those loads, mostly cooking and fluorescent lighting, where failure to do a job would result in competition to electric cooking, entrenching itself for years, or in possible loss of lighting load because of the greater efficiency of fluorescent over incandescent.

GEORGE E. WHITWELL

**Winner of the James H McGraw Award in 1935 for his work as originator of the Better Light-Better Sight activity, Mr Whitwell is so well known in the industry as hardly to need this introductory sketch. He is an MIT graduate in electrochemistry and taught chemical engineering for 3 years. His early utility experience was in the gas business in the Northwest. He came east in 1926 as general manager of the Equitable Gas Co with headquarters in Pittsburgh and in a year became general sales manager of the Philadelphia Co, later vice-president. He moved to the Philadelphia Electric Co in 1931 to his present position**

Much benefit can be derived in the industrial field through selling that will contribute to higher load and power factors. We are far removed from the day when the primary industrial job was the shutting down of the isolated plant. Today the applications of electricity to industry are legion. The alert and properly trained and directed salesman can choose to some extent to sell those applications which, while of real benefit to the customer, are, at the same time, peculiarly valuable to the utility. The same result can be obtained in many instances through the availability of carefully designed off-peak night and seasonal rate provisions.

Much of the effect of sales activity is delayed. To a large extent, though not entirely, the 1948 increases in load will result from sales pressure that has *already* been applied. This will be true in all markets. In the industrial market particularly, few major loads not already planned can possibly be added in 1948.

It takes time and costs considerable money to gather sales momentum. For example, if it is desired to substantially increase sales activity in any market in 1949, it is almost too late if a start is made now. There is an extreme shortage of people qualified for electric utility sales work. It is common experience that an average of about six months is needed to find suitable candidates. Then four to six months (much longer for industrial sales) are required for training before assignment to productive work. It is not uncommon, under today's conditions, for it to require a year or more from the time a decision is made to employ a group of sales people before any real sales results are secured.

It seems to be apparent that selective selling, intelligently adapted to each individual electric utility, is valuable, if not essential, under any conditions. When regarded from the viewpoint of the utilities' earning requirements over the near future, volume selling, carefully guided with an eye toward maximum sales of kilowatthours per kilowatt of capacity, less reserves, becomes a "must" for the entire industry.

# Debt Ratios And Rate Levels

H. LESTER HOOKER, Virginia State Corporation Commission, Richmond, Va.

FOR SOME TIME regulatory authorities have been opposed to permitting debt ratios in the power company capital structure substantially in excess of 50% of total capital. It is possible, however, that the yardstick should be somewhat flexible, depending upon various factors inherent in the capital structure. For instance it may be wise to permit a higher ratio of debt in a capital structure consisting solely of debt and common stock, than in a capital structure composed of debt, common stock and a substantial amount of preferred stock.

The effect upon the capital structure of the kind of debt securities included therein should also be considered. If it is composed of serial notes or bonds maturing over a relatively short period the effect upon the debt ratio will be its steady reduction. The extent and rapidity of the reduction should be taken into consideration in the determination of the maximum debt ratio which may be permitted. In this connection the ability of the company to meet such serial maturities, without securing new capital, and at a reasonable rate of return, should be considered.

### Earnings Should Be Adequate

It cannot be seriously questioned that the earnings of the power industry should be kept at a level high enough to attract sufficient capital to the industry to meet its reasonable demands. This is essential for our economic welfare. It is necessary for the proper protection of the public interest, and it is not adverse to the interest of the rate payer. It is the duty of the regulatory commissions to exert their best efforts to keep all utilities at all times in a safe and sound financial condition.

The public is suffering today because there are too many timid souls occupying positions of high responsibility who are constantly listening for the trend of the political winds, rather than devoting their energies and their abilities to the performance of their public obligations. Many of them are more interested in staying on the taxpayers payroll than they are in the preservation of the solvency of the taxpayer It is unfortunate that some regulatory commissioners keep their ears attuned to what may appear to them to be the most popular decision to make, rather than what is the fair and just conclusion to be reached from the facts of record. The increasing of rates to utilities is not a decision that will bring loud public acclaim, but if it is the correct conclusion to be reached, it should, in all fairness, and good conscience, be the decision rendered. When utilities are required to serve the public at miserly rates of return on their investments in property dedicated to public use, the public as well as the utility suffers. The public demands, and should receive, good service. It is essential for the public's best interest. But good service cannot be maintained when the rates are unreasonably low.

A utility should not be expected to maintain a high grade of service unless it is receiving a fair return on its investment. Any other view is shortsighted, and is detrimental to the best interest of the public. The customer should pay for good service and should receive it. Poor service at any price is high. It has not been my experience over a period of years that people in Virginia complain so much about rates as they do about poor service. They are willing to pay reasonable rates if the service is good. They are willing to "live and let live," so to speak. In Virginia information concerning all of our official acts is available to the public. The public can ascertain from our official records the data upon which we have reached our conclusions. We put the cards on the table face up. We keep nothing hidden from the public. It has been my experience over the years that the people are fundamentally honest and desire to give fair treatment and expect to receive it. It is up to the various commissions and utilities to see that they do get the facts and have them explained. When this is done there is going to be a minimum of criticism about decisions that have been rendered.

H. LESTER HOOKER

**Member of the executive and cooperative committees of the National Association of Railroad and Utilities Commissioners, Mr Hooker is a former president of that body. He is a lawyer, graduate of William and Mary College and of Washington and Lee University. He was elected to membership in the State Corporation Commission in 1924. He has served as special assistant attorney general of Virginia, as a member of the Board of Virginia State Teachers College, and as president of the Southeastern Traffic Association**

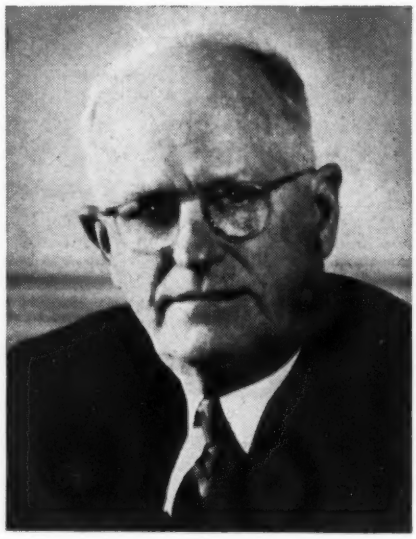
# Accident Prevention A Top Responsibility

**A. T. O'NEILL,** President, Buffalo Niagara Electric Corp, Buffalo, N. Y.

DURING THE THREE days we are meeting here in Atlantic City for this sixteenth EEI Convention, if general accident averages hold, at least one employee of this industry will have lost his life while on the job and more than sixty others will have suffered disabling injuries of greater or less severity. Projecting this figure forward, it means that during 1948, between 100 and 200 lives will have been lost and more than 7,000 employees, some of them yours and some of them mine, will have been disabled either temporarily or permanently. Based on this industry's accident record over the past years, what I have just said will become an accomplished fact unless you and I do more about it than we have in the past.

Accident injuries and death are unpleasant things to contemplate and in addition to the personal suffering and grief they bring about, they are, to be brutally frank, costly propositions to any company. They are costing the industry millions of dollars each year and they are costing employees additional millions by way of reduced earning power and expenses not covered by compensation payments. These are red ink entries clear across the books.

My observation and experience in accident prevention dates from the time when my direct responsibilities were in accident prevention and claims work in my own company. There is, in my opinion, no substitute for sustained active participation by the heads of the organization. If we want a safe organization badly enough, then we ought to be able to keep at it on a day by day basis. There is a chain of responsibility that binds you and me closer than is comfortable to these deaths and injuries if we are to face the issue squarely.



A. T. O'NEILL

**Associated with companies of the Niagara Hudson system for 39 years Mr O'Neill is well known in utility circles. He graduated from Colgate University, then studied law at Syracuse. His first power company job was in the claims and tax department of the then Syracuse Lighting Co. In 1930 he became claims attorney for the companies of the old Buffalo Niagara & Eastern Power Corp. When the Buffalo Niagara Electric Corp. was formed in 1945 by consolidation of the Niagara Hudson companies serving western New York, he was elected president**

In this present year, the industry has tools with which to work that are better than it has ever had before. The Accident Prevention Committee of the Institute has boiled down the lessons from billions of manhours of experience to a handful of safe practices expressed in the simplest of terms. If these safe practices were uniformly adopted today and enforced, then fatality rates and disabling injury rates would come tumbling down to a level that would make today's record look as high as the record of the 1920's appears to us today. Leadership is the missing factor and it is up to you and me to supply it. When the fact is fully appreciated that a high accident rate isn't just presumptive evidence of something wrong with management but the strongest kind of proof of it, we shall be on our way.

The amount of time needed to demonstrate the interest of top executives in safety and keep the organization hard at it is, by and large, comparatively small. Every hour that you and I devote to accident prevention will be returned many fold in a safe, happier and more efficient organization.

I suggest a few things to be done:

**1**—Establish a sound Safety Department with a man of thorough engineering training at the head of it, and once you are satisfied with the Safety Department as constituted, see to it that the recommendations of the department are adopted and enforced.

**2**—Follow the accident trends. If trends are unsatisfactory, call for reasons. If they are good, let your people know that you have noted the fact.

**3**—Require detailed reports, weekly if possible, certainly monthly at the outside, stressing violation implications and make sure that violation trends are stopped before serious accidents ensue.

**4**—Require that every person face his responsibility fairly and squarely.

**5**—Sample the workings of the program occasionally by personal observation.

**6**—Make certain that your employees know the rules set up for their safety. Do not presume they know these facts for you are presuming with their lives.

**7**—Don't skimp on expenditures looking to accident prevention.

# Taxes And The Stockholder

LEE P. STACK, John Hancock Mutual Life Insurance Co

WHY SHOULD ANYONE want to build a new plant with our graduated surtax staring him in the face? Should the venture succeed, the surtax would reap the reward and should it fail, the owner would lose his shirt. Neither is there reason to buy stock in a corporation contemplating the same venture. If successful, 38% will go for federal taxes and there might also be a state corporation tax, after which the stockholder would still be subject to high brackets upon his dividends.

When the surtax rates were low, your prosperous American welcomed risks—he thrived upon them. He was prosperous to begin with, because he had been successful in measuring the degree of risk against the measure of reward. The rank and file tried to emulate the man who had arrived, because then our tax laws permitted the accumulation of an estate. In those days there was no excuse for an enterprising American dying a poor man and he rarely did, unless he was mentally maimed or a confirmed alcoholic.

Now our people take no chances because there are no commensurate rewards. Such a system will wreck any nation. If small amounts are saved, our people immediately take them and run to cover.

There is a good appetite now for bonds, but practically none for stocks, for the simple reason that Americans have changed their habits of thrift. Such a freak situation is anything but healthy. Being thwarted in his efforts to build a competence, the individual is turning to pension funds for his old age and putting the rest of his savings into avenues largely free from risk. A trustee cannot accept risks when handling the funds of others.

England failed to keep its industry up to modern and efficient standards. Now not even its government can finance the transformation to modernity unless we help.

**LEE PRATHER STACK**

**Best known in the railroad field, Mr Stack entered the Seaboard operating department in 1915 after graduation from Duke University. He was president of the Lackawanna, 1942-'46, and has acted in reorganization committees for a number of railroads. He joined the John Hancock Mutual Life insurance Co in 1933 as assistant treasurer and is a director of several savings and investment banks**

The chief reason the British lost interest in keeping their plants modern was taxation. The London Economist has said, "It is common knowledge that the present cruelly high tax rates of direct taxation kill every incentive except that of tax evasion." There you are.

In America we have practically, if not quite, reached the extremes of British taxation. The great difference is that only during the war did we reach the peak whereas England has been administering a misguided tax policy since the First World War; and in view of its bitter experience, the time to save our industry is now.

For those who believe it good policy to tax the wealthy out of productive enterprise, let them ponder the plight of England today. You can tax the rich to pay doles to the poor or shiftless and no doubt it is good fun for the recipients while it lasts. Now, practically speaking, there is no wealth left in Britain to tax and since the cancer of high taxation and resulting obsolescence has eaten away much of its capacity to produce wealth, its citizens have not enough of food, clothing or warmth. It is probably with some justice that facing up to this situation is being done by a government representing the segment of people responsible for the ruinous taxes and doles. It will be a long and painful process. We have in this country a high degree of intelligence among our labor leaders and while time is running out, there is yet sufficient of it to permit them to perform a really statesmanlike service for their followers and spare them and their children the unnecessary tragedy suffered by their British cousins.

The scarcities which now plague us are only partly a result of the War, but more directly the result of making it unattractive to our citizens to enter into or continue productive business. The "Soak the Rich" enthusiasm has reacted with greater violence upon the poor. To realize this, one has only to consider the cost of commodities and manufactured products today. The rich are not rich because the poor are poor, and the income tax will never correct the difference.

From where I sit, there is no doubt but that double taxation, high brackets and the capital gains tax are the chief obstacles in the way of coaxing equity funds or risk capital into the American economy.

# Markets For Electric Utility Securities

**EDWARD HOPKINSON, JR,** Partner, Drexel & Co, Philadelphia, Pa.

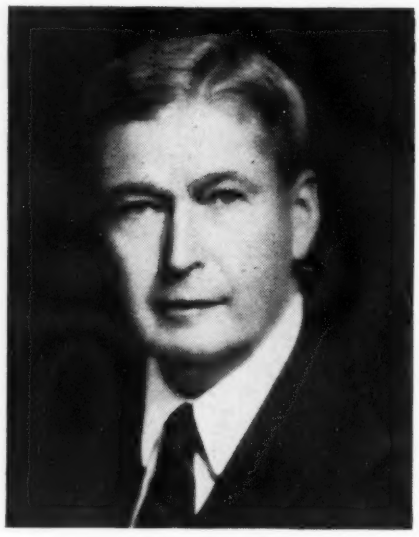
IF ELECTRIC UTILITY companies are going to finance to the best advantage their new capital requirements, they must make every effort to maintain or build up sound capital structures. The cost of money has a direct relationship to this factor. It can also be demonstrated that the harder the going in the money market, the more difficulty will be experienced by the companies with the weaker capital structures.

It is obvious that it is enlightened self-interest for any utility company to keep its structure, as nearly as possible, in sound balance so that it may realize a favorable investors' appraisal of its securities, whether they be bonds, preferred stocks, common stocks or securities dressed up with various wrinkles in an effort to make them more marketable at a better price.

### Debentures And Convertibles

The unsatisfactory condition of the common stock market has led to the use both of debentures and of preferred stock convertible into common stock as an alternative to the direct marketing of their common stocks. The principal disadvantage is one of mechanics involving the use of bonds in one hundred dollar pieces, and the problem of the small stockholder who usually receives only fractional rights to subscribe and to whom the subscription itself is probably hardly suited with its low interest rate.

During the low-yield period in 1946, a number of large institutional purchasers, recognizing the unlikelihood of the permanent maintenance of such preferred stock yields, many of which were as low as 3½%, began to insist on sinking funds, particularly in issues privately placed or where the market was not likely to be sufficiently broad to furnish a ready means of selling.



**EDWARD HOPKINSON, JR**

**President of the Investment Bankers Association of America, 1946-'47, Mr Hopkinson is a former partner of J P Morgan & Co. He entered investment banking in 1926 as a partner in the Philadelphia firm of Drexel & Co. He is a 1910 law graduate of the University of Pennsylvania. He has served as director of many companies, among them Public Service Corporation of New Jersey, United Gas Improvement Co, and Philadelphia Electric Co**

In my opinion, the inclusion of a sinking fund (or to a lesser degree of contingent purchase fund) is an expensive procedure and should be adopted only as a last resort. As far as can be foreseen, an electric distributing public utility is a permanent enterprise which will require expansion as long as the population of this country continues to grow. Therefore, to obligate yourself to retiring what should be permanent capital creates an obligation, if you have the earnings, just as real as any other debt but without receiving either the lower interest rate or the important Federal Tax advantage realized from interest paid. I think, in the long run, a public utility company will be better advised to pay, if necessary, somewhat higher dividends without a sinking fund because, after all, the rate of return in a regulated industry has relation to the cost of money.

I think recent events make any important recession in business activity during the year 1948 more unlikely than some of our economists and forecasters thought probable earlier. The adoption of the European Relief Program on a non-partisan basis, the corollary rearmament program and the passage of the tax relief measure over the President's veto, by overwhelming majorities, are all, in my opinion, constructive steps forward.

The adoption of these measures should strengthen our own confidence in the future and certainly reconstruction of Western Europe and our own preparedness for war, if need be, are the best ways to minimize the likelihood of war. True enough, the added foods and goods required for the European Program and for our own rearmament, while they do not represent an important percentage of our total production, mean some increases in inflationary pressures.

### Balanced Capitalization

My greatest concern is in the ability of companies to market common stocks to keep capitalization ratios in good balance. Of the enormous amounts of new capital raised in the first quarter of 1948, approximately two and one-half billion dollars, only about ten percent represented the proceeds of common stock financing. Investors are still conscious of the large blocks of common stocks to come out of the enforced divestment of public utility holding company portfolios, as well as of the requirements of the operating companies themselves for new capital.

# Revolutions And Road Blocks

CHESTER H. LANG, Vice President, General Electric Co

AMERICA, and particularly the electrical industry, is not slowing down for a rest. On the contrary, our revolution is just gathering momentum. At this very moment, with kilowatthour output at a peak, demand for new and additional service exceeds our most optimistic curves and dreams. Future growth bids fair to make the past seventy years look like a warm-up session. Better than any other industry, you know the necessity to be prepared for maximum output whenever it is required.

In my job I naturally see a goodly number of utility friends in a year. And so I've found myself conducting a kind of informal survey, to find out just what, actually, are the main planks in your platform for the future to cope with the difficulties ahead. Perhaps some of you will recognize your own thoughts coming back at you as I attempt a grassroots appraisal of your program for tomorrow, as expressed by your own people. What they say seems to take shape as a kind of six-point program.

### No Stop To Expansion

First of all, one is assured of a fundamental belief in the necessity for an aggressive, continued program of plant expansion. Yet, great as your expansion program now is, there is a growing recognition that even this is not enough; that, as the American economy expands, the power industry in its traditional role of leadership must double and triple its capacity to generate and distribute electric power.

Second plank in your program, according to these interesting conversations, is an increasing awareness of the importance of public relations. It is clear that the public will no longer be uninformed about the achievements of the business-managed power companies. Any reader of the popular magazines is familiar with that effective series of advertisements, jointly sponsored by the business-managed companies, which is driving home the achievements of the free electrical industry.

CHESTER H. LANG

**Joining General Electric in 1919 as a traveling auditor, Mr Lang progressed through publicity, advertising, budgetary and sales duties to vice-president, to which office he was elected in 1941. As manager of apparatus sales, his concern is with equipment for power generation, distribution and utilization. He served as chairman of General Electric's Defense Coordinating, later the War Projects, committee which coordinated the company's many activities in the war effort. He was born in Erie, Pa, and is a graduate of the University of Michigan, Class of 1915**

The third major plank in your platform for the future, as I see it, is a renewed willingness to fight, boldly and unafraid for sound financial results. The utility industry has a committed expansion program in excess of 1½ billion dollars per year, but cash generation within the companies will provide only ½ billion a year. Thus utility needs for new private capital are nearly a billion a year, representing one-seventh of the new capital needs of all industry. Earnings must be attractive enough to bring in this capital. And this involves the fundamental question of rates.

One would be rash indeed to talk rates to experts. But if a rise in rates is called for to provide sound results for a particular company, why be timid about it? I hasten to say rate changes are not in my bailiwick. But if inadequate rates stand in the way of steady, planned expansion of generating capacity, I repeat—I see no reason to be timid about fighting for a change in them.

A fourth problem frequently mentioned is another element in the financial picture. And that is the rising cost of money. There's no denying this rise. Long-term lenders are asking a higher interest rate.

There is a fifth point that figured strongly in many conversations—and that is the attraction of top-quality men into the ranks of your organizations. Throughout the electrical industry, there is an increasing emphasis on recruiting campaigns which are not only better organized, but more inspired.

There is one more (a sixth) plank in this platform for the future—one that was expressed over and over by the men who guide the industry's destinies. One after another said, "In spite of our short reserves, our company is going to accelerate its selling program."

You are the agents of an industrial revolution. But unlike the traditional pie-in-the-sky revolutionist, your role is a constructive one. Simply, it consists of being good, sound, aggressive business men. Your program of action, if I have interpreted correctly what many of you have said, reflects just that.

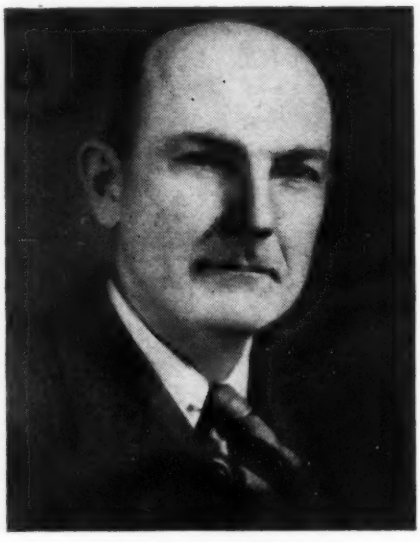
# The Future . . . A Challenge

**J. B. THOMAS,** President, Texas Electric Service Co, Fort Worth

FIRST IN THE LIST of items of the challenge that faces our industry I would place the need for an alert, aggressive sales philosophy. We are on a good tide of public interest and acceptance, and it is my opinion that we should aggressively sell our products and our business. I have little patience with the viewpoint that, because of brief equipment shortages, we should curtail our sales effort, diminish our sales forces, or refuse to accept the responsibilities of serving the electrical needs of the communities in which our properties are located.

High in the list of the elements of this challenge I would place the technical and scientific progress of the world at this time. Can we ourselves use it in our business wisely and profitably? Many of us who have seen the efficiency of generating equipment more than double in our lifetimes are now looking at new equipment and the possibilities of new equipment yet to come.

Next on the list, I would put the challenge of the changing character of our business. As economies in fuel are affected; as the services we bring into homes and stores and factories grow greater in number; as investment goes higher and the fixed charges rise; as taxes take an ever increasing slice out of the money that we earn; I wonder if all of us realize that, particularly in the residential field, our business had made a transition, rather a startling one, from one whose product could be measured as a commodity to a predominantly service business. It is time to recast our philosophy of charging for residential service. It is time to work out some way to charge for service instead of for kilowatthours. I suggest an economical load limiting device that will give notice when the lamp or gadget, which exceeds the established limit, has been turned on.



J. B. THOMAS

**Texan all the way is Mr Thomas —born in Texas, graduate of Texas A & M, never worked anywhere else. He started as a foundry apprentice, gave the cotton oil business a trial, got into the utility field as superintendent of a municipal plant, and began his power company career with a job as draftsman for Texas Power & Light in 1912. He rose to chief engineer in 1919 and when the Texas Electric Service was formed he became vice-president in charge of operations. In 1941 he was elected to his present office**

Next on the list, I would place the challenge of seeing that our customers know what and who we are and what we are doing for them. If we just give good service and say nothing, the service is soon taken for granted and people think that the lights should go on at night just as the sun rises in the morning. Are you doing your best to keep people alive to the things we bring them, to the reliability and value and extent of our service; to our part in building and sustaining the communities which we serve?

What are you telling people about the faults and shortcomings of the governmentally financed projects that threaten our industry, and all private enterprise, with collectivism? About governmental subsidies paid out of taxpayers' pockets with which to build plants that unfairly give lower rates to customers in one section of the country than can be fairly given to those in another section served by tax-paying private enterprise? You have a hundred things to talk about. I say it is time to go on the offensive and tell what is wrong with those adventures in collectivism, and how they injure the country and its citizens.

And lastly, in the event rearmament and the shadows of war again come on us, as now seems probable, we are faced with the challenge of keeping that indispensable tool of our past growth and progress, namely the diversity between customers and community needs over large areas and the integration of groups, large enough to meet the problems of growth at the time, and large enough to have the substantial financial credit necessary to make the best possible solution of future problems. I say that with the shadow of war upon us, we should ourselves set up for these emergencies regional organizations of utility men with the skill and courage and wit to work out the coordination of construction and operation, and financial participation, to provide the necessary facilities in our respective regions.

I feel that the courses of action I have suggested are necessary if we are to survive and grow as we should; and that it is time to wake up the great, placid organization we have in the EEI and put it to work aggressively so that the public may know the facts about our business and about those who unfairly seek to tear it down.

# The Utility And The Community

A. C. SPURR, President, Monongahela Power Co, Fairmont, West Va

WE HAVE BEEN convinced for a long while that working for the communities is good business because it is apparent we cannot prosper unless our communities and customers prosper first. But we were sort of pushed into doing something about it by a report of a Federal Commission that made an exhaustive study of part of our territory with the idea of making it a junior TVA. But the Commission suggested that the private power company be given a chance to see what it could do in the way of developing the natural resources of the area and showing a social as well as an economic awareness of its responsibilities.

We took that report to the newspaper editors in the ten counties covered by it and in partnership with them formed a ten-county development association called the Upper Monongahela Valley Association. From our experience in working with the communities through that association came our territorial development department and a program that now is operating throughout the entire area in which we serve. We are putting especial emphasis on agriculture. We now have five former county agents who are project directors in a contest, "Farming for Better Living," also a housing counselor, a recreational and tourist advisor, an industrial counselor, a soil conservationist, a farm management specialist and a forester, together with a manager of the department and local representatives in four of our six operating divisions.

Our folks make a lot of public appearances and become associated with a great many community activities. Whether or not the people with whom they are working give any thought to their identities as power company employees, they're accepted into community circles for the job they are doing and judged by the way they do it. We long ago learned that people are not interested in our problems, but they are interested in their own, and appreciate anything that anyone else does to help them. The newspapers share that viewpoint and treat the activities of our folks as legitimate news, and rightly so. These contacts have shown us very definitely that the communities' problems are our problems but our problems are not the communities'.

A. C. SPURR

**Born in North Dakota, a country of wide horizons, Clint Spurr brought that far vision into his business career. Thus is explained why he sees his job as power company president in terms of community, not just utility management, responsibility. Graduating from Yale, he worked for the B & O RR, served in World War I, then briefly in the fish business. He joined the Pittsburgh Railways Co in 1920, moved to Wheeling Traction 1925, then to Blue Ridge Lines as president in 1931. In 1933 he became assistant to the president, West Penn Electric Co, and moved to his present position in 1935**

In preparation for this discussion today a survey was made of other companies, to find out just what they were doing about community relations and community cooperation. The last time I checked the figures, 83 out of 146 companies had responded to our questionnaire.

Eighty-two of them answered that they do maintain direct and intimate relationship with community organizations. Most of them belong to chambers of commerce and civic clubs; they support the churches and schools and the social and welfare groups in their communities.

Only 29 companies, however, answered that they had departments dealing exclusively with area development. And, in answer to the question, "Do you have a prepared program covering policy, activity and job responsibility?," the replies were a bit discouraging. Only 17 companies had defined policies of community development; 20 had programs of activity to be followed; and 19 had prepared statements of responsibility of those engaged in development activities.

These figures tell me that from 15 to 29 of the companies represented here today are doing more than letting their community relations follow the course of least resistance. Seventeen companies have said they have definitely formed policies of community development; 29 have departments dealing with the development of their areas.

One can go into any section of the country and find it definitely and impressively demonstrated that the electric power industry is playing a vital role in community and territorial development. This is so impressive to me that I still can't help but wonder why more isn't heard about what's being done.

# 30,000 Hours A Minute

**GWILYM A. PRICE**, President, Westinghouse Electric Corp

IF the last minute was typical of all that will tick by in the next 10 years, it brought an addition of slightly more than 30,000 kilowatt hours to the annual sales volume of your industry. Multiply that by the number of seconds in a decade and you arrive at an increase of 157 billion kilowatt hours, which will result in total annual sales of 374 billion 10 years from now.

This forecast of a 72% increase in sales of energy results from a recent study made by our company. The projections are on a long-term trend basis, with no attempt to time such cyclical swings as may occur. They are based on our assumption of the continuance of a high level of peacetime industrial activity and employment. Please mark that word—peacetime.

Within the next decade, the power-generating facilities of our country will need to grow to about 95 million kw. This is an increase of about 80% over the present installed capacity—an annual increase of over 4 million kw, even without replacement of obsolete equipment. And this is not all, because your systems will have to be expanded to handle this power. In the next ten years you may spend, for new construction, an amount equal to the present value of your utility plant after 60 years of growth.

Improved living stardards are a prime reason for our prediction that there will be a 73% increase in average use by residential customers, while the number of customers increases by one-sixth. Our forecast is 2,400 kw-hr average annual usage in 10 years.

Next, there will be a great increase in the farm load. We anticipate a 42% rise in the number of your farm customers, to the point where 9 farm families out of every 10 in the nation will have electrical service. The average annual farm usage should go to 4,000 kw-hr.

GWILYM A. PRICE

**The American saga is told in the life of Mr Price. Son of a roller in a tin mill, his is the story of success by a man who made his own opportunities. He is a law graduate of the University of Pittsburgh. From law he turned to banking and became president of the Peoples-Pittsburgh Trust Co in 1941. He joined Westinghouse as vice-president in 1943 and was elected president in 1945**

Again, our forecasts show that the use of power by small businesses—industrial and commercial—will rise by more than one-half, while demand from the large industries and commercial establishments is likely to climb even more.

The more we delve into the source material of this forecast of power usage, the more conservative our estimates appear to be. Very quickly one ceases to wonder where the load will come from. The wonder is rather as to how the demand for power can be satisfied; will you be ready for these loads; can manufacturers build equipment rapidly enough; can it be installed soon enough; and the key question of all, will there be enough money to finance the construction program which must be carried through in the coming years?

Here, too, we are optimists, and our studies give every encouragement. As to the industry's technical ability to carry through this program, there can be no question. This industry always has been one of great technical accomplishment, and it will continue to be.

In common with all industry, you face the problem of accelerated obsolescence to plant, due both to its wear and to the necessity for substitution of superior equipment. This situation may lead the utilities, as it has other industries, to adopt bolder programs of retirement of assets. This will call for understanding judgment on the part of the authorities who pass on rate structures and security issues. You cannot be expected to satisfy these vastly expanded power demands with the existing plant and treasury.

Capital expansion since the war has been financed up to now almost entirely out of industry's own funds and its borrowings. The water is running low in both reservoirs. So we look to venture capital to prime the pump for the future; and we find that the trickle from that stream supplied only 2% of capital expenditures in 1947. I make these observations: 1. Venture capital will not go to work for today's starvation wages. 2. The simplest and fairest method of raising those wages is to eliminate the double taxation of dividends.

This money problem will be solved, because it has to be. So, too, with every problem that may arise as to machines, materials, operating techniques, management methods, or sales expansion.

# Sound Rate Design In Tomorrow's Economy

E. N. STRAIT, Manager, Rate and Research Division, Pioneer Service and Engineering Co, Chicago, Ill.

REGULATORY COMMISSIONS have two basic obligations to perform. One is to see that rates are fairly and reasonably dealt with in the interests of both customer and company; the other, to insure adequate service, which requires that the utility company must be enabled to raise sufficient capital to provide it. There are many indications that regulatory commissions understand the present financial needs of the public utility companies and, in general, have a sympathetic attitude toward what is necessary to enable the companies to meet their capital requirements.

To enable regulatory commissions to act properly in relation to the revenue needs of electric utility companies, the companies themselves should adequately present to the commissions comprehensive showings of their present and future requirements. Satisfactory understanding and approval on the part of the public may also require public presentation of such information.

In considering the question of necessary revenue increases, management must consider not only the reduction which has occurred, or may develop, in the company's earning power under its present rates, brought about by the increased cost of its plant, operating expenses and interest rates, but also the decrease in purchasing power of whatever earnings it may have available for dividends and surplus. It is up to management not only to find means of raising additional borrowed capital at reasonable going rates of interest but also to seek to do something to improve the take-home wages of the invested capital of its stockholders. This requires that management seek, and regulatory authority allow, rates which will result in revenues sufficient, in the aggregate, to yield reasonable returns measured by present economic relationships.

E. N. STRAIT

**After graduation from the University of Wisconsin in 1912, Mr Strait was employed by the public service commission of that state until 1916. He kept himself busy as valuation engineer, service inspector, chief statistician, and general technical handy man. Then he went to work for Col Byllesby and has been associated with the Byllesby organization and its successors ever since. He is widely known as an authority in the public utility rate field**

Sound rate design involves legal, economic and commercial principles. For an understanding of the legal principles, we should, of course, look to laws on regulation; for the economic, to studies of finance and costs; and for the commercial, to examinations of methods required for satisfactory marketing and customer relations.

An important thing to observe, in the provisions of regulatory law, is that rates must be just, reasonable and non-discriminatory, and that, in determining just and reasonable rates, the commission and, consequently, the public utility, with the commission's approval, may take into account the quantity, the time the purpose of the use of service, and any other normally reasonable consideration.

Sound rate design must be predicated on sound economic principles. First of all, rates must produce revenues that are adequate to meet the costs of operation, depreciation and taxes, and any other operating expenses chargeable to current income, and leave enough in excess of that to yield a fair return on the investment in the business.

Sound rate design must also result in rates for various classes of service, which are reasonably in accord with the cost of service, to the end that each class shall fairly meet its share of costs and not be a burden on other classes of customers.

Rate-making of the future should be done on the basis of adequate understanding of the utility company's own costs and of the load characteristics of the service for which the rates are designed. Rates should also be designed to promote adequately the use and sale of electric service. This requires that, under some conditions, the probable cost to the customer of substitute service must be considered. In some other types of utilization, the sale of electricity often depends on competition for the customer's dollar.

Summarizing in a simple definition, I would say that:

Sound rate design is that which yields a fair and adequate return to the investor at charges to the customer that are not discriminatory, that gives reasonable effect to differences in costs, that does not exceed the value of service which customer and company interests indicate should be furnished, and that is as simple in form as economic requirements permit.

# Who Are Our Stockholders?

**HAROLD S. SUTTON,** Treasurer, Consolidated Edison Co of N. Y., Inc

WHAT KIND of people had bought Con Edison stock, and why did they buy it? Had they in fact bought it, or how had they come by it? If they had bought it, what considerations influenced them to buy it? Were they investors or speculators—how many of them were holding the stock for income and how many in hope of profit? How many of them owned Consolidated Edison stock only? In how many cases was it simply one of their several investments? Into what age groups did they fall, and into what income brackets? What did they do for a living, or how many of them were retired and living on income?

We surveyed the 108,000 individual stockholders in our total list of 124,000 and got some answers to such questions from the 27% return we had.

Our first conclusion from analysis of the returns was that stockholders are people, are just a cross-section of the body politic, with two general exceptions. One is that the stockholder group is older, the median age being 40% higher than that of the nation's adult population. The other is that the annual income is higher.

Some specific points and conclusions included:

95% owned other stocks as well as Con Edison; 51% owned over 10 others.

But this does not mean that stock is owned by a group of wealthy investors, because median stockholder income reported was $4,700, and largest single listing was "housewife", 24%. Next came proprietors, 19%; retired, 18%; professional 16%; clerical, sales and others 23%.

Median holding, 24 shares, about $800 at present market.

Stock acquired by purchase, 87%; by inheritance 9%, by gift and other means, 4%.

**HAROLD S. SUTTON**

**Previous to his election as treasurer of Consolidated Edison, Mr Sutton had been executive assistant to the head of the company for 10 years. came into the utility business via banking, having become associated with Floyd L. Carlisle in 1919 as assistant manager of the bond department of the Northern New York Trust Co, of which Mr Carlisle was then president. Until he joined Consolidated Edison in 1935, Mr Sutton was connected with various Carlisle interests including St. Regis Paper Co, Northeastern Power Corp, and Niagara Hudson**

Most of the stock is held for income, 64%; for both income and appreciation, 35%; for appreciation alone, only 1%.

Influences to purchase stock were Con Edison dividend record, 33%; faith in the public utility industry, 27%; company's financial condition, 18%.

To the question, "Would you buy more Con Edison stock?", 74% replied "Yes". Of the remaining 26% who said "No", 23% gave as reason that they wanted to diversify their holdings to a considerable extent.

These stockholders are not a class apart. They are people. To have become a stockholder in the first place, presupposes some degree of self-denial and saving effort, and presupposes confidence in an economic system that will make self-denial and saving worth while. In a country dedicated to the individual private enterprise system, these citizens deserve all consideration, encouragement and applause. They deserve the right to be heard.

### Just A Dream?

Would it be too much to hope that some day, somewhere, some regulatory body, conscious of the true nature of the owners of the business—realizing that stockholders are people—and faithful to its original conception as a quasi-judicial body—would it be too much to hope that such a commission might say in its annual report, "During the past year, this Commission brought about no rate reductions whatever, in view of the rising costs of operations. Indeed, in the case of one company in the state, where rising costs threatened earning power and hence the safety of the dividends which its X-thousands of stockholders have been receiving regularly for the past X-number of years, the commission permitted a prompt and substantial rate increase. But we would point out that, based upon recent studies by various governmental agencies, the cost of service to that company's average user will constitute no more important element in the family budget than it did formerly, considering the recent rapid increase in the average family income."

Fantastic? Utopian? Well, maybe so. But now that we are beginning to know who the stockholders actually are, we ought to try to make out a case for them.

# A Look At Your Earnings Record

ALAN H. TEMPLE, Vice President, National City Bank of New York

IT IS to the implications of declining selling prices, rising costs and declining profit margins that we should now address ourselves.* Business has grown. Revenues have grown. Plant has increased only moderately, and over most of the period it was financed out of depreciation and retained earnings without recourse to outside sources of capital. Rate of return was maintained. Meanwhile, however, the growth of operating income did not keep pace with the growth in business. To put the matter as simply as possible, growth in volume covered up trends which should now cause concern. The industry should have done better during a period of such high utilization of plant.

Now the industry requires a substantial amount of outside capital, perhaps $3 or $4 billion for a five-year period 1947-1951. To attract this additional investment on favorable terms, to support the increased overhead and capital charges, and to maintain a favorable credit position, operating income for the industry as a whole will have to increase. Plant additions financed not from retained earnings but from the sale of securities must show a rate of return sufficient to attract further capital in competition with the requirements of other industries.

An addition to net plant increases the base for rate making purposes, but such addition does not of itself provide increased operating income. Actual increases in operating income have to come from one or more of the following circumstances: (1) actual rate increases or (as may be the case at present) an end to periodic rate decreases, accompanied by continued growth in electric sales; (2) savings in operating costs arising from the replacement of less efficient generating facilities; (3) further increase in electric sales making for a high use factor of the added capacity; (4) a decline in the present high level of fuel and labor costs; (5) a decline in taxes.

Fortunately, the growth is not ceasing nor need we feel apprehensive that it will cease. Nothing is likely to stop it. However, it may slow down or even stop temporarily. Conservative investors are attracted by the industry's growth and stability. But they cannot feel entirely free of concern induced by declining margins. Should the industry ever approach a saturation point, a continuation of this long-term trend of margins would prove destructive. To maintain the attractiveness of utility securities for conservative investors, every effort should be made by the industry and by regulatory authorities to check the decline in the profit margin on sales.

**ALAN HARRISON TEMPLE**

**Bank economist Temple is a 1917 LB in journalism of Columbia University. He has been editor of "Commerce and Finance" and financial editor of the "North American Review." He became statistician of the National City Bank in 1931 and was elected vice-president in 1941. He was 1947 chairman of the Conference of Business Economists and is a member of the American Economic Association and a member of the American Statistical Association**

* Previous to statement of his conclusions, Mr. Temple showed a series of 11 charts, of which the chief points are summarized:

(1) Electric utility gross revenues, $1.4 billion in 1946, $3.5 billion in 1947, 150% increase, rate of growth 4.5% compounded. Corresponding total figures for all U. S. corporations, $143 billion, $275 billion, 92%, 3.2%. Shows more rapid rate of long term growth of utilities, also greater stability.

(2) Net income after taxes of utilities more stable than total of all corporations, but growth of net is at a relatively low rate.

(3), (4) and (5) Rate of return on net worth of utilities averaged 7.3% over 22 years; of trade corporations, 11.4%; of transportation undertakings, 3%; of all manufacturing industries, 8.7%; of steel industries, 4.1%; of petroleum industries, 6.9%. Utilities show greatest stability of rate over the long term, but in recent years the rates of return of manufacturing and trade corporations have had a boom that gives them a strong competitive advantage in the capital markets.

(6) Profit margins per sales dollar of utilities, railroads and all manufacturing corporations show a long-time downward trend, more so for utilities than for manufacturing industries.

(7) On 1935-1939 averages as index bases, cost of living is now up 68% and price of electricity down 30%.

(8) All major expense items of utilities, except interest, have grown steadily, some of them sensationally, such as fuel, and salaries and wages.

(9) Although depreciation funds are steadily rising, they are only a small fraction of what is needed to finance new capital expenditures.

(10) Electric and gas utilities needed $2.1 billion in new funds in 1947, of which $1.2 billion was obtained from banks and from new security issues. This indicates the measure of the current financial problem, shows that the utilities must make themselves attractive to lenders and investors.

(11) In past 10 years, manufacturing corporations, taken all together, increased plant and equipment 48%, output 66%, 300%. But utility plant and equipment gross income 137%, and net income yearly increase was only 14%, output 88%, gross income 71% and net income 31%.

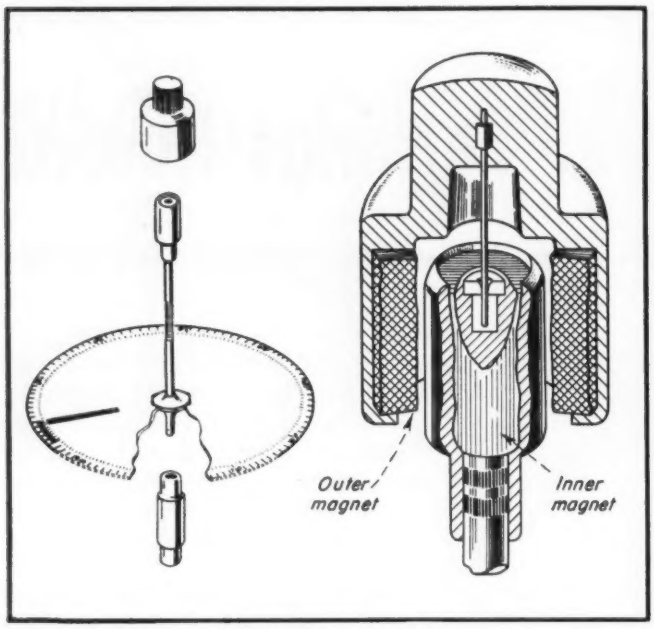



**FIG 1—TWO CYLINDRICAL MAGNETS** provide the suspension for the disk of the new type watthour meter

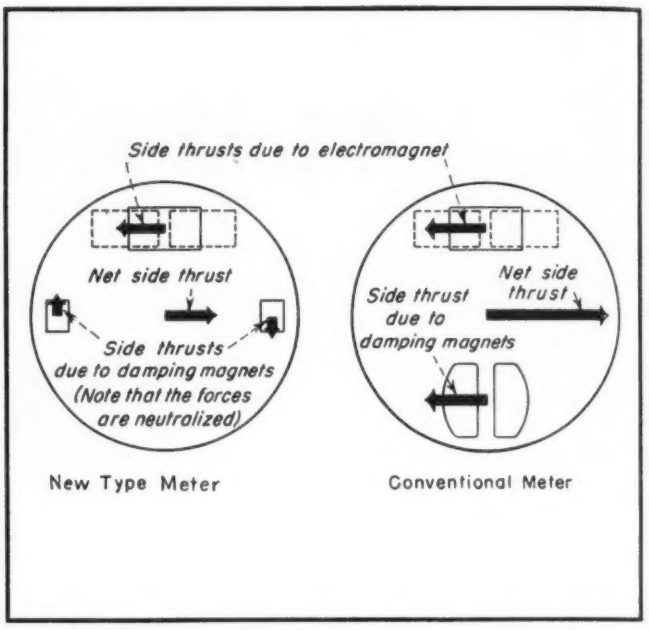

Side thrusts due to electromagnet
Net side thrust
Side thrusts due to damping magnets (Note that the forces are neutralized)
New Type Meter
Side thrust due to damping magnets
Net side thrust
Conventional Meter

**FIG 2—SIDE THRUST** is greatly reduced by placing the damping magnets on opposite sides of the shaft

# New Design Of Watthour Meter Has Magnetic Suspension

## Jeweled bearing eliminated by employment of cunico magnet suspension . . . Side thrust minimized . . . Sustained accuracy the objective . . . Size and weight reduced

I. F. KINNARD
Manager of Engineering, Meter and Instrument Divisions
General Electric Co
West Lynn, Mass.

ADMITTEDLY, modern meters have become superior devices, hardly matched in sustained accuracy by any other device used in vending a service or commodity to the public.

Nevertheless recent trends and discussions indicated that there was call for an even better device particularly if one could be designed to meet all the recognized desires. For example the extension of the test period in many states to 8 years warrants a meter with the least possible likelihood that there would be a change in its accuracy of registration on light load. The crux of testing is usually the light load behavior or injury to the magnets by a lightning stroke. Another matter of discussion in metering circles has been that of corrosion, particularly of outdoor meters or those subjected to salt fog. Still another item of more or less perennial issue is that of possible weight and size reduction. To help meet these and other industry requirements a completely new design of watthour meter embraces the following features: (1) Friction of the moving element maintained at low level; (2) long life and sustained accuracy; (3) further improvement in overload, voltage and frequency characteristics; (4) coordinated insulation; (5) improved resistance to corrosion; (6) easier test and adjustment; (7) lighter weight (30% reduction); (8) small dimensions (18% reduction in volume); and (9) improved appearance.

The major objective in the development of the new type meter has been to reduce maintenance. This has been accomplished through the use of a magnetically supported moving element and an over-all coordinated design wherein bearing maintenance has been eliminated and high accuracy and long life are realized.

A small amount of magnetic material (high coercive force cunico) supports all the weight of the disk and shaft and eliminates the need for jewel bearings, which have been a main cause for meter maintenance. Long previous efforts with jewel bearings using pivots or balls and vari-

ous materials and lubricants has not resulted in a complete solution.

Construction of the magnetic suspension is shown in Fig 1. Two cylindrical permanent magnets of the high-coercive and machinable material, cunico, are placed one within the other, the outer magnet being fixed to the meter frame and the inner magnet attached to the upper end of the disk shaft. The concentric magnets are magnetized axially with opposite polarities. The resulting field supports the rotating moving system at a definite and small downward displacement.

To keep the moving system in line, stainless-steel guide pins are provided at the top and bottom. Graphite guide bushings at both ends of the shaft run on these guide pins without lubrication. The only possible cause of mechanical friction and wear in this system is the presence of side-thrust forces, and the rest of the design has been carried out so that these are inherently very low. This construction replaces the conventional bearing where the entire weight of the moving system and most of the side-thrust forces are experienced in the jeweled lower bearing.

In the conventional jeweled bearing the bearing stress due to the weight of the disk is of the order of 200,000 pounds per square inch. In the magnetically suspended moving element the bearing stress due to the weight of the disk is completely eliminated. Moverover, the torque-to-weight ratio, which has long been accepted as being in the order of 3 or 4 to 1, has been increased to infinity. This comparison in both cases ignores the secondary effects of side thrust.

Side-thrust forces arise from the action of the electromagnet and the damping magnet on the meter disk. In the conventional meter the electromagnet is mounted back of the frame and the disk shaft, and the damping magnet is located at the front of the meter. (Fig 2). When a torque is created in the disk by a power load, the driving torque is equivalent to a side thrust at the location of the electromagnet. Motion of the disk causes a corresponding side thrust at the damping-magnet position. The total side thrust on the disk bearing is equal to the sum of these forces.

In the new meter large reduction in the side thrust has been achieved by locating the damping magnets closer to the electromagnet than has been heretofore possible. The only significant side thrust present is that due to the electromagnet. This pressure is in the order of 100 pounds per square inch at maximum load, which is conservative for the material involved.

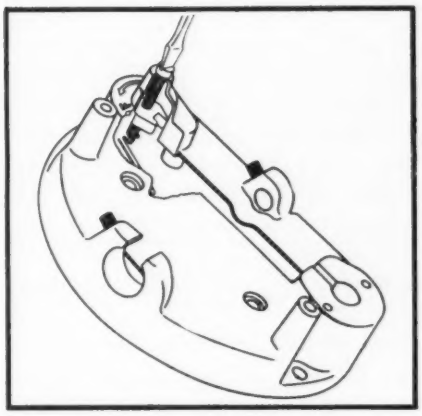


**FIG 3—THE DAMPING** magnets are die cast in an aluminum frame which affords protection against demagnetization

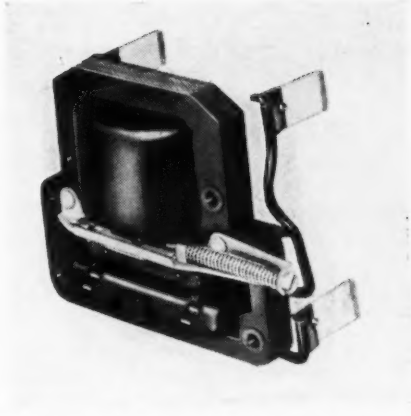


**FIG 4—ELECTROMAGNET** coils are impregnated with butyl rubber (current coils) and polyethylene (potential coil)

Availability of the high-coercive-force alloy, cunico, has made possible the present design without resort to soft iron and with only small stator and rotor magnets to give the necessary lifting force. As a consequence, and because of the proportions used and precision manufacturing, the side thrust due to eccentricity is so small that it may be neglected.

Registration per meter of nearly 200 developmental meters has totaled normal registration since October 1941 equivalent to 65 years of normal service or about 80,000,000 revolutions. These tests have shown excellent stability of the magnetic suspension.

### Magnets and Electromagnets

The damping system of the new meter consists of two small C-shaped magnets embedded as inserts in the die-cast aluminum-alloy frame (Fig 3). The magnets make use of the high energy and high-coercive properties of alnico V and as a consequence a large amount of damping is obtained in a small design. Die casting the magnets into position in the frame results in an assembly with the magnets fixed in position and surrounded by the aluminum die-casting alloy, which enhances the excellent surge-resistant properties of alnico V. This combination with the small size of the magnets has made possible the location of the magnets near the electromagnet, and yet they are immune to demagnetization from fields that arise from large short-circuit or lightning currents to which meters are sometimes subjected.

New high insulation level compatible with the general practice of installing meters out-of-doors and ahead of service entrance fuses and switches has been provided in the electromagnet (Fig 4). The current coils are formed of bare copper wire. For assembly they are located with the electromagnet core in a mold that aligns all parts with proper spacings. Butyl rubber is then introduced to the closed mold and cured in place. The result is an accurately and securely located current coil with the rubber providing turn, coil, and ground insulation.

Butyl rubber has long-life properties even at the elevated temperatures to which meters are sometimes subjected. The molded-coil construction also contributes to low temperature rise and high over-load capacity because of efficient heat dissipation.

For greater insulation strength, reliability, and secure positioning, the layer-wound potential coil, consisting of many turns of fine wire, is similarly molded to the electromagnet core. The molding material is a polyethelene plastic of high dielectric strength and low moisture absorption.

Main full-load adjustment made at the factory is accomplished by demagnetizing the damping magnets in the meter frame to give the proper

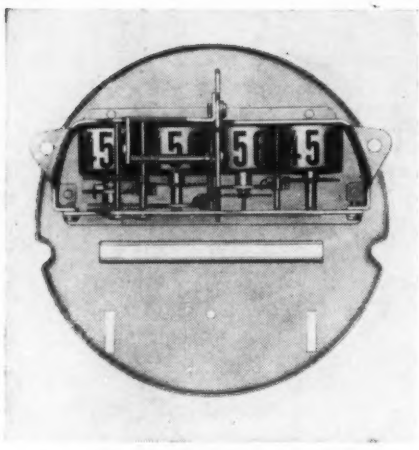


FIG 5—**CYCLOMETER** register has wheel axles vertical. Indexes center properly under influence of magnetic-storage snap-action

disk speed at rated full-load power on the meter. This is done to within 1%. For the final precise calibration the full-load vernier adjustment (Fig 3) is used. This is a magnetic shunt that is moved to change the effective damping strength of the right-hand magnet.

The lag or phasing adjustment and the light-load adjustment are both attached directly to the electromagnet (Fig 4). The lag adjustment is made only at the factory. A temperature-sensitive magnetic core is included on the lag plate to maintain the phase angle over the operating temperature range. The light-load adjustment consists of a closed conducting loop movable transversely with respect to the electromagnet to provide an adjustable shading-pole torque for adjustment at light loads to close limits.

### Register and Base

Registers are furnished for the new type meter in either the pointer type or the cylometer type.

In the cyclometer register, friction has been greatly reduced by placing the number cylinders on vertical rather than horizontal shafts. A new feature employing magnetic storage and release of energy gives a positive reading action. Cylinders 2, 3, and 4 are advanced (Fig 5) from digit to digit quickly as controlled by snap action occurring in the shaft assembly for Cylinder 1.

The new type meter is available in both the socket-base (S) type and the bottom-connected base (A) type. Much attention has been given to corrosion resistance. The base of the S-type meter is a single piece of molded Textolite and the cover ring is stainless steel. In the A-type meter all exposed metal parts are made of aluminum to give good corrosion resistance.

Both types incorporate coordination of insulation levels. Included with the S-type base are ground straps that contact the socket when the meter is installed. These are held to the base by rivets that project into the interior of the meter with a controlled air gap spacing to the line leads of the current coils. The voltage breakdown level of the relief gaps is lower than the high insulation level of the electromagnet. Thus overvoltage breakdown is directed to the point where it will do least damage, and in most cases the meter will not be put out of service. A similar construction is employed in the A-type meter, keeping breakdown away from the terminal block and the electromagnet.

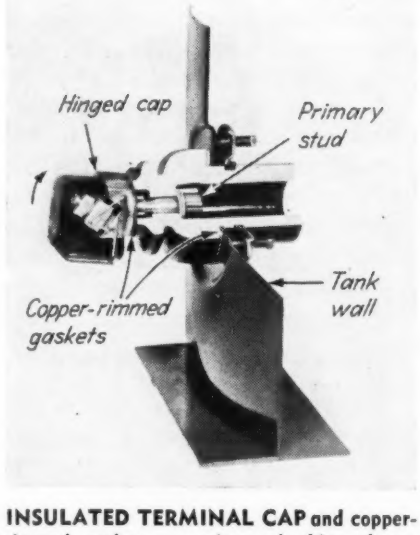
# New Bushing Arrangement For Distribution Transformer

STUD-TYPE high-voltage and low-voltage bushings mounted directly on tank walls and fitted with specially-protected weatherproof gaskets are designed into distribution transformers recently developed by engineers of the Pennsylvania Transformer Co. Use of side-wall bushings on both primary and secondary sides of the newly-devised transformers is a departure from conventional bushing-pocket design.

### Design Features

Downward issuing pocket-type bushing construction in distribution transformer design originated in the days of through-type bushings. It has been retained, especially on the primary side of many transformers even though modern stud-type bushings and gasket seals have largely eliminated the problems of oil and moisture migrations that formerly fostered it.

It was felt that the pocket construction gave mechanical protection to the porcelain during handling and storage but in most cases they projected beyond the outer edge of the pocket. It did give considerable additional protection to bushing gaskets if they were not altogether weather resistant.



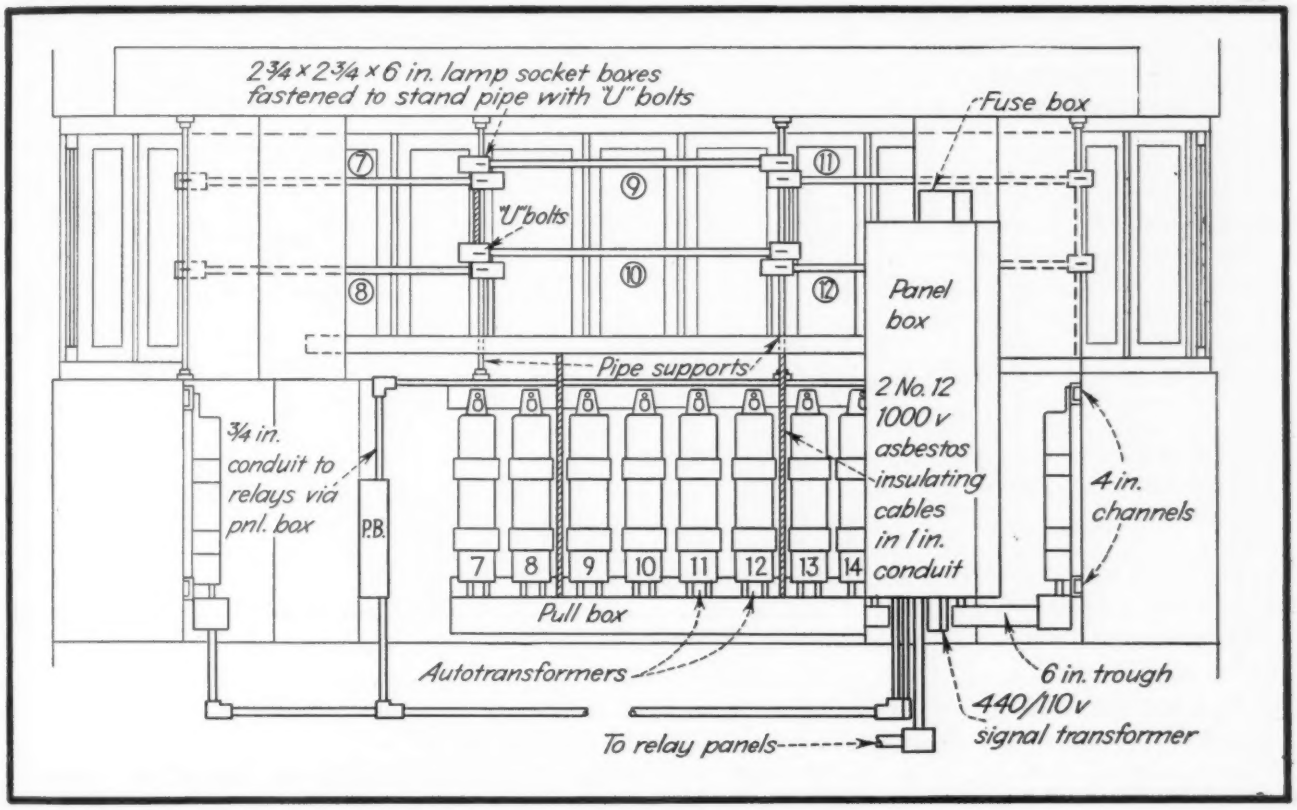

**INSULATED TERMINAL CAP** and copper-rimmed gaskets on primary bushing shown. Protective cap swings out of way in making connection

In this new design, exposed edges of all side-wall bushings are protected from weather by copper rims preformed on the gaskets interposed between the terminal and the porcelain and also between the porcelain and the tank wall. The copper rim protects the gasket material from moisture and sunlight deterioration. Inwardly embossed tank walls provide flat surfaces for the gaskets.

### Terminals Protected

Outside terminals of high-voltage bushings have solderless connectors that allow line leads to issue downward, making installation easier when replacing older-type pocket bushing transformers. Terminals are protected by insulating caps that are hinged to the terminal base and can be swung in and out of position leaving the connector completely exposed while the line lead is being fastened to the bushing. The cap is closed by hand and locks into place to cover completely the primary bushing terminal.

# HOW TO DESIGN • CONSTRUCT OPERATE • MAINTAIN


2¾ x 2¾ x 6 in. lamp socket boxes fastened to stand pipe with "U" bolts
Fuse box
"U" bolts
Panel box
Pipe supports
2 No. 12 1000 v asbestos insulating cables in 1 in. conduit
¾ in. conduit to relays via pnl. box
P.B.
4 in. channels
7 8 9 10 11 12 13 14
Pull box
Autotransformers
6 in. trough
440/110 v signal transformer
To relay panels

**MOUNTING TECHNIQUE** for lamp socket boxes and autotransformers on pipe framing

## How To Light A Tower Beacon

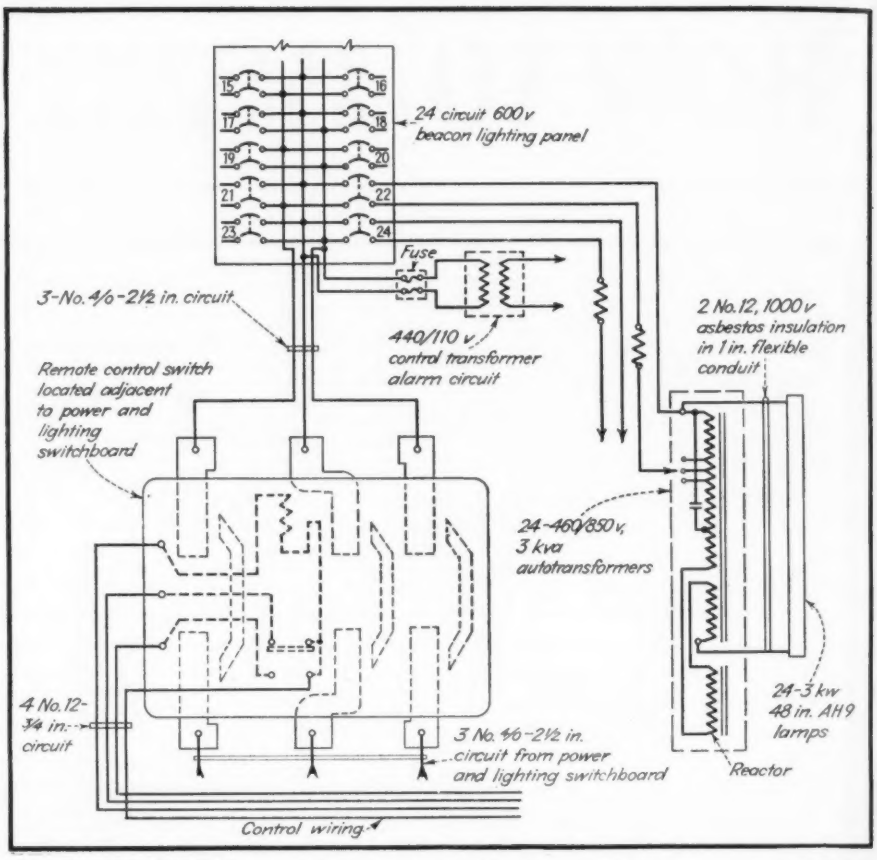
**METHOD OF MOUNTING** 3,000-w tubes behind glass of tower windows

CONNECTICUT'S FAMOUS landmark, the beacon atop the Travelers Insurance Co tower in Hartford, has been re-lighted. Formerly twenty-four 480-w Cooper-Hewitt lamps did the work; today 3,000-w mercury lamps fill the bill. Lumens per lamp have been increased from 4,500 to 120,000. Total wattage is up from 11,520 to 72,000 for the units. The lamps are mounted 490 ft above Main Street and, with the wiring and control features, were installed by the Baldwin-Stewart Electric Co, Hartford. The installation re-design was by Voorhees, Walker, Foley & Smith.

The new lamps are mounted in two horizontal rows behind glass windows on the 34th floor of the tower. The tubes are 9 in. back of the glass and 16 to 18 in. apart. General Electric type AH-9 lamps are used, with GE lampholders and Curtis-strip

channel and cover. Each lamp is supplied with energy at 850 v from its own autotransformer. A 3-phase, 440-v circuit of No. 4/0 conductors supplies the 24 transformers through a 24-circuit lighting panel in the tower. Each circuit is provided with a 600-v circuit-breaker in the panel. The transformer secondaries feed the lamps through 2-wire circuits of No. 12 conductor insulated with varnished cambric and asbestos and run in 1-in. flexible conduit.

The 440-v supply circuit is run from the basement to the tower installation, the main control center being in the former location. Here a remote control switch is mounted to cut in and out the supply to the tower. A comprehensive pilot light and alarm system has been provided, showing when all lamps are operating properly. The beacon may be operated manually if necessary. An astronomical time switch on dusk and dawn schedules normally controls the beacon. Before removing or replacing any lamp, it is required that the circuit breaker feeding its individual transformer be opened.




**SCHEME OF WIRING** to supply energy to autotransformers feeding mercury vapor lamps

# O.H. Line Estimating—11* Standard Minute Units


**THEORDORE H. GUCK**
Overhead Lines Dept
The Detroit Edison Co
Detroit, Mich.


STANDARD MINUTE units are used in connection with all estimating for overhead-lines labor of the Detroit Edison Co. These figures are the average time it takes to complete the operation called for in the unit, as established through actual field studies and checked in use.

All units and minutes are tabulated in order of the sequence of operations, and enough detail is included in the unit book used for estimating reference to cover the usual range of conditions. Field estimators simply enter the unit numbers and quantities on the estimate sheet. Estimates are completed by the office clerk, who enters standard minutes and arrives at the total cost value by using the prevailing average rate.

The accompaning table shows examples from the estimators book.

**LABOR UNIT ESTIMATE SHEET**

DISTRICT Wayne AREA NO. SHEET NO. 1 OF 1 SHEETS

LOCATION: CITY OF GARDEN CITY
Elmwood and Dillon

DEPT ORDER NO.: M-25849

MAP SECTION NO.: Nan 9-3

WAREHOUSE: Ecorse Road

DATE WANTED:

GENERAL DESCRIPTION: Install 3 poles, 3 sections of secondary, and 1 transformer.
Remove 1 transformer, 2 sections of primary.
Replace 3 sections of primary.

E & O REPORT NO.:

REASON: Rearrange distribution to permanent position in conjunction with new business extension.

E & O NO.:

DATE ISSUED: 9-6-46

TO C. D.

| WORK ORDER | | UNIT NO. | 1 | 10B | 100 | 107 | 131 | 140A | 190D | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 354 A3 J2 | | QUAN. EST. | 3 | 3 | 2 | 1 | 6 | 4 | 1 | | | |
| | | STANDARD | 120 | 405 | 60 | 80 | 60 | 60 | 100 | | | |
| DATE | FS NO | DIRECT FIELD CHARGES | QUAN INST | QUAN INST | QUAN INST | QUAN INST | QUAN INST | QUAN INST | QUAN INST | QUAN INST | QUAN INST | QUAN INST |
| | | | | | | | | | | | | |
| | | | | | | | | | | | | |
| | | | | | | | | | | | | |
| | | | | | | | | | | | | |
| | | UNIT NO. | 301C | 301D | 301E | 316A | 316E | 431 | 442A | 451 | 460A | 477 |
| 355 A4 J2 | | QUAN EST | 3 | 1 | 1 | 3 | 1 | 6 | 2 | 1 | 2 | 2 |
| | | STANDARD | 360 | 25 | 80 | 150 | 70 | 30 | 40 | 150 | 40 | 100 |
| | | | | | | | | | | | | |

TOTAL DIRECT FIELD CHARGES
PERCENT STD FOR WORK COMP IS OF ESTIMATE
ESTIMATOR NO.
PERCENT STD FOR WORK COMP IS OF DIR FIELD CHARGES
CREW NO.
EST STR MIN AMT MATERIAL TOTAL
QUAN OF UNITS COMP
STD FOR WORK COMPLETED

**LABOR UNIT ESTIMATE SHEET** entries refer to standard unit descriptions

**Examples Of Unit Minute Values With The Standard Description Used in Estimating**

| Unit | Description | Minutes |
|---|---|---|
| 1 | Haul pole | 40 |
| 10 | Install pole—average soil | |
| -A | Digger—1 pole 25-40 ft | 240 |
| -B | —More than 1 pole | 135 |
| -C | Hand—25-40 ft | 280 |
| 100 | Crossarm and hardware | 30 |
| 101 | Crossarm—double brace | 40 |
| 102 | Buckarm—back brace | 60 |
| 107 | Double Crossarm | 80 |
| 120 | Double up existing crossarm | 90 |
| 140 | Install rack | 15 |
| 190 | Anchor guy—3M | 70 |
| 193 | Anchor guy—16M | 240 |
| 301-A | Install 2 No. 4 primary—ground | 40 |
| -B | Install 2 No. 4 primary—air | 85 |
| -C | Install 2 No. 4 primary—adv. cond. | 120 |
| -D | Dead end 2 No. 4 primary | 25 |
| -E | Splice 2 No. 4 primary | 80 |
| 316-A | Install 3 No. 2 secondary—ground | 50 |
| -D | Dead end 3 No. 2 secondary | 30 |
| -E | Splice 3 No. 2 secondary | 70 |
| 430 | Dead end spool | 15 |
| 431 | Insulator—distribution | 550 |
| 451 | Tested ground | 150 |

* This series began in EW, May 22, p. 146

# The Farmer and the Contractor KNEW WHAT THEY WANTED!

**THE FARMER WANTED** a nonmetallic sheathed cable that would withstand weather extremes—stand up to fumes and corrosive vapors present in livestock houses and dairy barns.

**THE CONTRACTOR WANTED** a cable for jobs where extra quality is a "must" —a lightweight and flexible cable for easy pulling and clean, fast work.

The result? Super PVX*

Super PVX is a top-quality cable for those difficult jobs where easy installation and long service under the worst conditions are important. The tough, rotproof thermoplastic insulation and reinforcing glass braid result in smaller over-all dimensions and substantial reduction in weight.

**Super PVX**
**NONMETALLIC SHEATHED CABLE**

The smooth, durable thermoplastic rotproof sheath is available in ivory or brown color, to give trim, neat appearance on surface wiring jobs. And, it's as tough as it is good looking, to provide ideal protection from abrasion, moisture, flame, corrosive vapors, and fumes. It is approved by Underwriters' Laboratories, Inc.

For samples, see your General Electric Construction Materials distributor, or write to Section W6-627, General Electric Company, Bridgeport 2, Connecticut.

**GENERAL ELECTRIC**

## AROUND THE CIRCUIT with your Merchandise Distributor

STILL DOING A GOOD JOB is PVX nonmetallic sheathed cable. This cable is light, small in diameter, and more flexible than conventional cables. These features are the result of skilled engineering in cable construction. They are built into PVX to give you easy handling, to speed installations, and to keep PVX on the job after it is installed. Let us give you more information on this outstanding cable. You'll find many uses for it.

DON'T WORRY ABOUT OIL—General Electric's Type TW wire doesn't. This thermo-plastic building wire has the ability to resist oil year after year, even when immersed in it. And, it's equally unconcerned about moisture and most chemical vapors or fumes.

EASY INSTALLATION—This service entrance cable can normally be installed exposed directly on the outside of the building. Service entrance cable is one of many items described in the new General Electric catalog, *Building Wires, Cable and Cords for every purpose.* If you would like a free copy, write to Section W6-618.

DON'T OVERLOOK this sales potential—The next time you call on an industrial customer, look around and you'll notice dozens of uses for Flamenol* cords. Notice the variety of equipment that requires replacement cords. It's a good way to pick up extra business . . . and add to your volume and profit.

General Electric also makes rubber-jacketed cords in many sizes and constructions. They're built for long service and outstanding performance. Ask us about Flamenol or rubber-jacketed cords; we'll be glad to tell you more about them.

*TRADE-MARK REG. U.S. PAT. OFF.

# Seam Welding Lap And Butt Joints

J. J. RILEY†
Taylor-Winfield Corp
Warren, Ohio

ADVANTAGES OF lowest electrical power demand, high production because of greatest rate of making spot welds, sturdy construction, and simplicity of maintenance have resulted in increasing use of the traveling head series seam welder for joining strip. This type of spot welding machine uses roller electrodes. Strip of any width within the machine clearances can be welded without affecting the welding characteristics. The strip is not within the secondary characteristics circuit and thus does not cause any welding current variations, as the welding head proceeds across the strip width.

The welding transformer is mounted on a carriage running on steel rails. It is connected to two circular welding electrodes operated by individual pressure cylinders through flexible copper conductors. As shown in drawing (left), the electrodes complete the circuit through the two welds made in series and the short circuiting platen beneath the strip.

Electrodes are spaced 5 in. apart for a strip thickness range up to and including 0.062 in. The distance between electrodes is a function of strip thickness because of the series welding condition. The circular electrodes are of opposite polarity. Since they contact the same sheet considerable current is shunted through this sheet without passing through the welds. Consequently, the impedance of the top sheet must be sufficiently high between electrodes to cause sufficient current to flow through the two sheets and short circuiting platen to make welds.

When the sheet thickness increases more than 0.062 in. the same type of unit can be used but the joint design must be changed to that of a butt-strap arrangement as shown in drawing (right). A relatively thin sheet in contact with the welding electrodes keeps the necessary high impedance between circular electrodes.

In the average lap-joint application, a weld is usually a series of clusters of spot welds approximately 1½ in. long and 3 in. apart on centers. The pattern is determined by the required joint strength; and is made by the weld timer controlling the "on" and "off" periods of welding current flow.

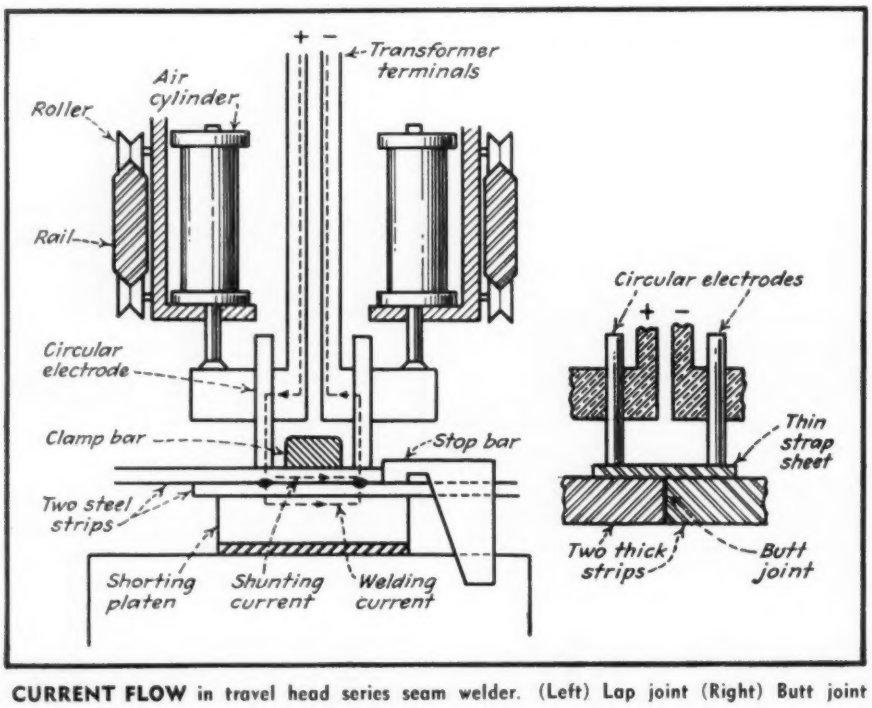
In making a weld, the tail end of the preceding coil of strip steel is run through to its proper location in the welder and the stop bar clamped on this strip. The head end of the succeeding coil, after being sheared square, is run against the stop bar, which locates its end close to the leading electrode. As a result the first line of weld is made near the leading edge of the joint. This prevents loose edges from fouling on other processing equipment. After both strips are located, the center beam clamps them securely. The welding controls are energized and the two circular electrodes descend, contact the upper strip and proceed across the strips making the weld. As the electrodes clear the opposite edge of the strip, they are automatically retracted.

The welding current flows from one transformer terminal through one circular electrode, through one weld, through the short circuiting platen beneath the strip, through the other weld and circular electrode and back to the transformer resulting in two series spot welds 5 in. apart. Such a circuit is very efficient electrically and from an operating standpoint doubles the production as two rows of spot welds are made at the same time. Speed of operation can be judged from Table I.

**Table I—Series Seam Welding Data For Joining Two Pieces Of Clean Low Carbon Steel Strip**

| Steel Strip Thickness, in. | Welding Speed, in. per min. | Welding Current,* amp | Welding Force, lb | Welding Timing,** cycles On | Off | Power Demand, kva | Welding Electrode Face Width, in |
|---|---|---|---|---|---|---|---|
| 0.010 | 360 | 12,000 | 1,000 | 8 | 8 | 75 | 1/4 |
| 0.025 | 324 | 16,000 | 1,100 | 8 | 8 | 125 | 1/4 |
| 0.038 | 252 | 17,000 | 1,280 | 6 | 8 | 145 | 1/4 |
| 0.062 | 120 | 20,000 | 1,350 | 9 | 20 | 195 | 1/4 |

* Includes current for welding plus the current that shunts across the upper sheet contacting both electrodes at an electrode spacing of 5 in. center to center
** Based on a frequency of 60 cycles per sec




**CURRENT FLOW** in travel head series seam welder. (Left) Lap joint (Right) Butt joint

† From "Resistance Welding Equipment Used in Steel Mill Strip Processing" presented at 1948 AIEE General Meeting.

# What's my name?

That's the title of G-E's new, fast-moving radio quiz show! Contestants guess the name of famous persons. There's fun and excitement aplenty—with the audience right in the act! "What's My Name?" will help build your profit load by reminding customers to fill empty sockets and stimulating wider use of all types of G-E lamps—sunlamps, heatlamps, and lamps for lighting.

Star of the show—keeping the fun moving as G-E's quick-witted Mistress of Ceremonies—is that sparkling personality of the airwaves—one of Broadway's leading comediennes—

## ARLENE FRANCIS

**SATURDAY EVENINGS, ABC NETWORK**

# New Radio Show for G-E Lamps

MORE FUN FOR MILLIONS OF LISTENERS

MORE FRIENDS FOR G-E LAMPS

BIGGER PROFIT LOADS FOR UTILITIES!

**G-E LAMPS**

**GENERAL ELECTRIC**

# Operating Principles Of Fluorescent Lamp Starters

E. NEWHALL
Merchandising Supervisor*
Sylvania Electric Products Inc
Salem, Mass.

FUNCTIONING of four types of starters is outlined.

### Glow Discharge Type Starter

Operates on thermal principle; a bimetallic strip contact is actuated by generation of heat from an electrical discharge in a gas such as neon.

Details—Switch contacts (one of bimetal) are normally open. When line switch is closed, voltage across switch contacts causes gas to "ionize" or pass an electric current. Resultant heat causes bimetal strip to close circuit so that lamp electrode preheating is accomplished.

Upon closing of contacts, ionization process stops. Bimetal strip cools, opens electrical circuit, and allows arc to strike in the lamp. Contacts remain open but voltage across contacts is same as voltage drop across the lamp; insufficient to cause gas to ionize.

### "Mirastat" Starter

Operates on thermal principle; a bimetallic strip contact is actuated by generation of heat in a high-resistance contact.

Details—Nickel-carbon switch contacts are normally closed so that lamp electrode preheating begins immediately upon closing of line switch. Heat generated by high resistance of nickel- carbon contact causes bimental to break from carbon thus opening the circuit and lighting the lamp. Bimetal strip is formed around a small high-resistance element connected across the lamp terminals. The element provides heat so that bimetal contact blade is in an open position during normal lamp operation.

If lamp is turned off and then on again, open circuit voltage is impressed across the resistor and heat is generated. This causes the bimetal strip to curl still further until it touches another contact, thus pre-heating the lamp electrodes. This short-circuits the high-resistance element, allowing it to cool. In turn, the bimetal strip cools, breaking from the restarting contact, opening the circuit, and lighting the lamp.

### Speed "Glostat" Starter

Operates like the glow-discharge type of starter with two distinct cycles which determine the total time required to light a lamp; (1) Time required for the glow discharge to generate sufficient heat to close the contacts and start the preheating of the lamp electrodes; (2) Time required for the elements to break contact and light the lamp.

Details—Starter has two electrodes of wire bimetal design separated by ionizable gas. Heating of the electrodes closes contacts and ionization ceases. Electrode cooling begins. Electrodes separate again. A series of "momentary breaks" thus produces an accumulation of transient voltages of high intensity and these are effective in starting the lamp.

### Cut-out Starter—Manual Reset Type

Operates on thermal principle; opens the starter circuit when a lamp has failed to light and operate in the normal manner.

Details—Included in a starter, a cut-out mechanism consists of a small Nichrome wire resistor in a ceramic shield and enclosed in a brass clip. Bimetal strip at end of clip has upper end formed into a latch that secures a section of a phosphor bronze wire. Starting circuit is completed through this wire and latch.

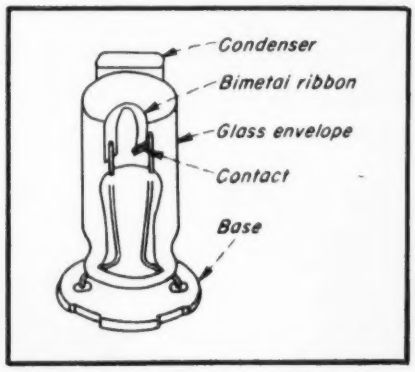
During normal starting cycle, the heat generated by starting current in resistor element is not sufficient to disturb the bimental latch. Since no current flows through this resistor except during the preheating period, the latch remains closed. When a lamp fails—as evidenced by flashing—repeated passage of starting current through resistor element generates in the ceramic shield heat which is conducted by the brass clip to the bimental latch. The latter releases the phosphor bronze wire, breaking the circuit and cutting the failed lamp out of operation.

Button on top of starter reinserts the phosphor bronze wire under the bimetal latch.

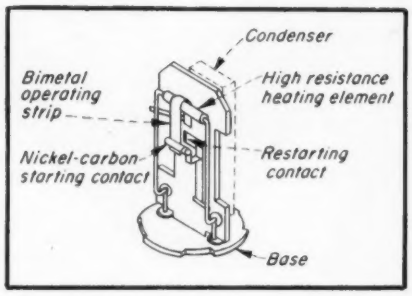
A radio interference condenser is included on all foregoing types of starters.

Superiority of foregoing starters has led to obsolescence of the magnetic and thermal types.

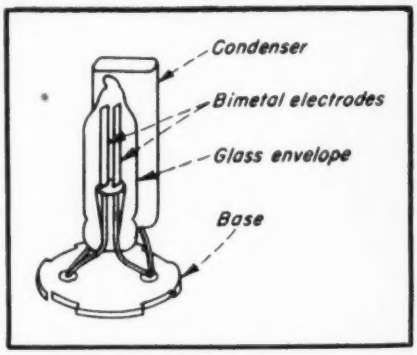
Accompanying table lists advantages and limitations of the various starters.



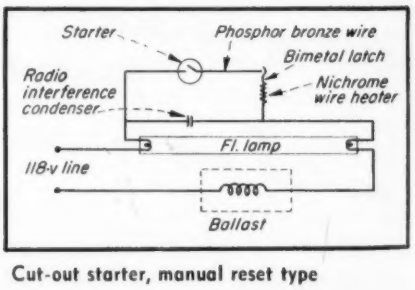

Glow discharge type starter




"Mirastat" starter




Speed "Glostat" starter




Cut-out starter, manual reset type

*Author was Commercial Engineer when material was compiled, and is now Merchandising Supervisor of Wiring Devices in the Lighting Products Division.

### Advantages And Limitations Of Four Types of Starters

| | Glow Discharge Starters | Mirastat | Speed Glostat | Cut-out Starters |
|---|---|---|---|---|
| ADVANTAGES | | | | |
| 1. Enclosed in glass | X | | X | |
| 2. Replaceable in fixture | X | X | X | X |
| 3. Fast action | X | | X | X |
| 4. Suitable for AC or DC | | X | | |
| 5. Prevents flickering lamp | | | | X |
| 6. Provides ballast protection | | | | X |
| 7. Low cost | X | | X | |
| 8. Long Life | | | | X |
| 9. Reduces fixture maintenance cost | | | | X |
| 10. Rugged construction | X | | X | X |
| LIMITATIONS | | | | |
| 1. Slow action | | X | | |
| 2. Applicable for AC only | X | | X | X |
| 3. No ballast protection | X | X | X | |
| 4. Allows lamp to flicker | X | X | X | |
| 5. Unreliable if excessive fibration | | X | | |

# Pennsylvania Railroad Electrification outages per Year

TYPE OF SYSTEM: Single-phase with mid-point grounded at two points on conductively-coupled network through 330 ohms resistance.

IMPULSE INSULATION: 1025 kv., 1½ x 40 mu s wave, positive, critical.

NORMAL TOTAL TIME TO CLEAR GROUND FAULT: Trolley faults, less than one cycle. Transmission faults, 4½ to 15 cycles from inception of fault to de-energized circuit (25-cycle base).

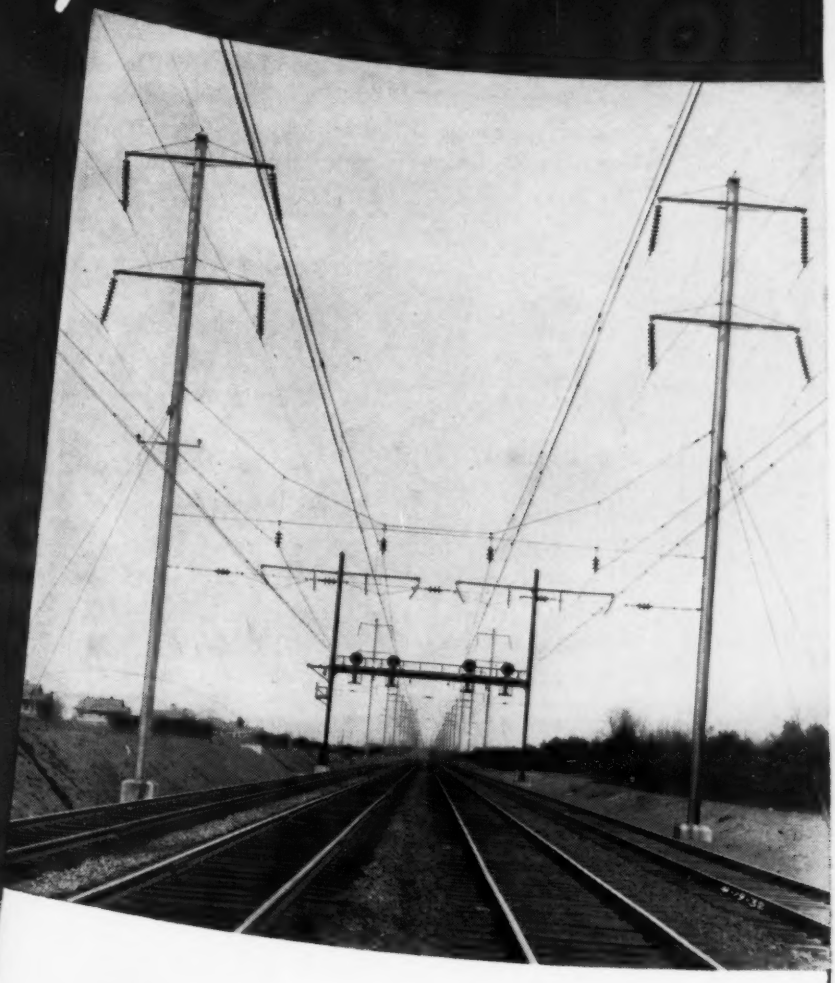
GROUND FAULT NEUTRALIZER OR PROTECTOR TUBES: None.

ARC DAMAGE TO INSULATORS OR CONDUCTORS: Seldom.

AVERAGE ANNUAL LIGHTNING OUTAGES: 7.2 over total 132-kv network based on five-year average.

AVERAGE ANNUAL LIGHTNING OUTAGES PER 100 MILES: .674

FOOTNOTE: Lightning poles have been used in 81 substations as protection from lightning strokes to their structures or their contained apparatus. No case of damage to any apparatus has been so-produced though numerous strokes to these poles have been witnessed. A portion of the lightning poles are supported on concrete foundations and are connected to the station ground network. In other cases, the lightning poles are supported on the substation steel framework which, in turn, is connected to the substation ground network.



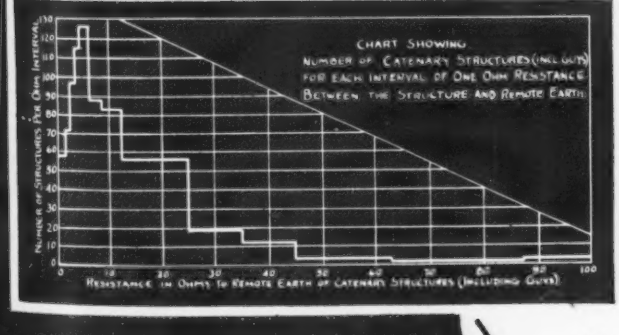


CHART SHOWING
NUMBER OF CATENARY STRUCTURES (INCLUDING GUYS) FOR EACH INTERVAL OF ONE OHM RESISTANCE BETWEEN THE STRUCTURE AND REMOTE EARTH
NUMBER OF STRUCTURES PER OHM INTERVAL
RESISTANCE IN OHMS TO REMOTE EARTH OF CATENARY STRUCTURES (INCLUDING GUYS)

In the interests of technical progress of high-voltage transmission, this series of operating reports is presented to the Electrical Industry. As a manufacturer of insulators and hardware, the Ohio Brass Company is vitally concerned in this development. These reports and many others will soon be compiled in book form and made available to power company engineers.

**Ohio Brass**

2954-H

MANSFIELD, OHIO

CANADIAN OHIO BRASS CO., LTD., NIAGARA FALLS, ONT.

# Chart Determines Copper Temperature Rise

**Chart provides a quick, easy and accurate means of determining copper temperature rise above ambient. Unlike previously published charts, it eliminates the error due to normal variations in initial and final ambient temperatures. It is accurate to within one degree which is consistent with good laboratory equipment and technique**

GEORGE F. BANKS

Testing Department, Commonwealth Edison Co, Chicago, Ill.

CHART is based on the formula

$$\Delta t = \frac{R_2}{R_1}(234.5 + t_1) - (234.5 + t_2)$$

where

$t_1$ = initial temperature of copper (ambient air or insulating liquid)

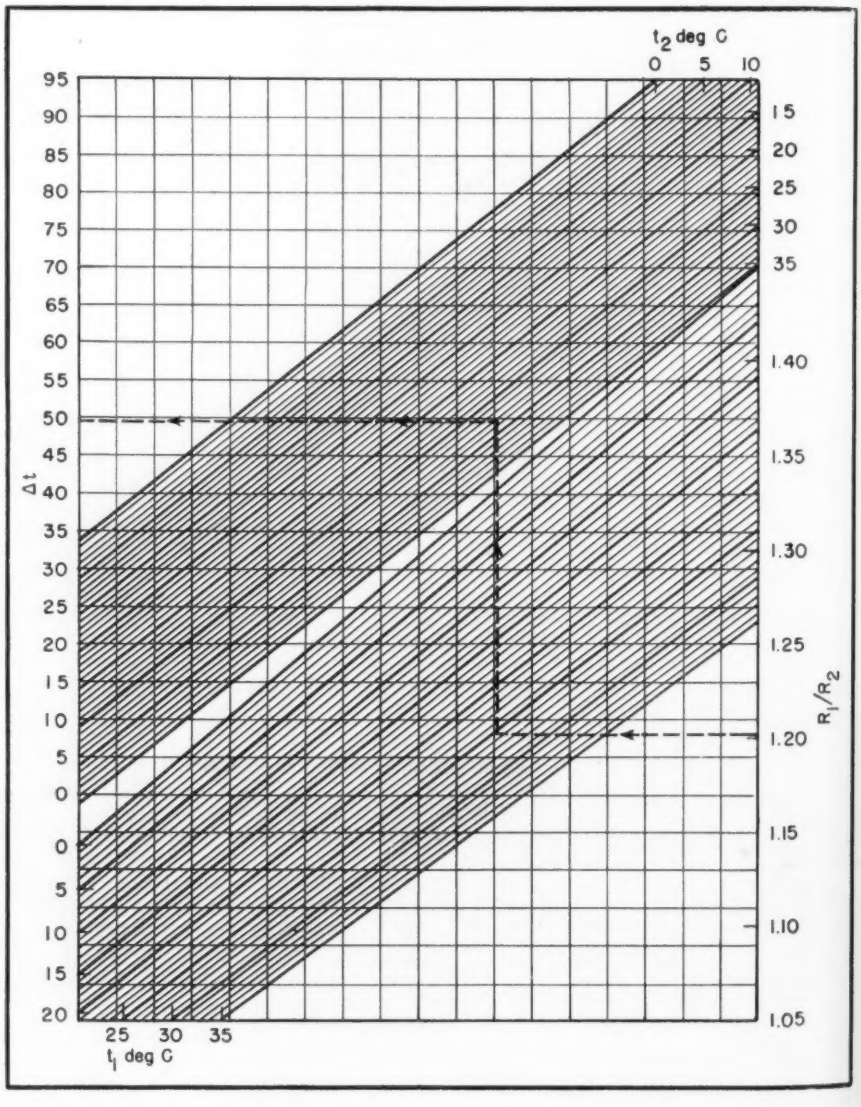
$t_2$ = final ambient air temperature

$R_1$ = initial resistance at temperature $t_1$

$R^2$ = final resistance at ambient temperature $t_2$

$\Delta t$ = copper temperature rise above ambient air, $t_2$.

All temperatures are in degrees centigrade.




### Example

**Problem:** Determine the copper temperature rise above ambient on an oil-cooled transformer.

Heat test data on high-voltage winding shows:

$R_1 = 0.2150$ ohms
$R_2 = 0.2584$ ohms
$t_1 = 25.2$C
$t_2 = 28.2$C

Ratio $R_2/R_1$ is found to be 1.202.

**Solution:** By steps shown on chart. The $R_2/R_1$ value (1.202) is projected horizontally to the $t_1$ group of curves. At the test finding $t_1$ (25.2C) the line is projected vertically toward the $t_2$ group. At the test finding $t_2$ (28.2C) the line is again projected horizontally to the left. The copper temperature rise above ambient is read direct from the $\Delta t$ scale. In this case it is found to be 49.3C.

This rise determined from the formula is found to be 49.5C. If initial and final ambient temperatures had not been taken into consideration (i.e. 25.2C assumed as initial and final) the rise would have been found to be 52.5C.

# ABOUT THE FIRST INCANDESCENT COLOR TONE!

# TONE!

## A *SYLVANIA-DEVELOPED* LAMP

*that gives*

## MORE LIGHT! MORE COLOR!

Here's one of the most revolutionary lighting developments in years—a development that will greatly broaden the field for fluorescent illumination.

Warmtone—originated by Sylvania—combines, for the first time, the established advantages of fluorescent with popular, friendly *incandescent color tone.*

In addition, Warmtone gives 7% more light than previous types of fluorescent lamps.

The new softer color of Warmtone will win quick acceptance in thousands of homes, stores and offices. Warmtone is currently available in all the popular sizes.

You—and your clients—will want to know more about this far-reaching development. Write today for the full story on Sylvania Electric's new fluorescent lamp—Warmtone.

**SYLVANIA ELECTRIC PRODUCTS INC.**
**LIGHTING DIVISION, SALEM, MASSACHUSETTS**

# ELECTRIC

**PHOTOFLASH BULBS; RADIO TUBES; CATHODE RAY TUBES; ELECTRONIC DEVICES**

# Controlling Power Input To Arc Furnaces

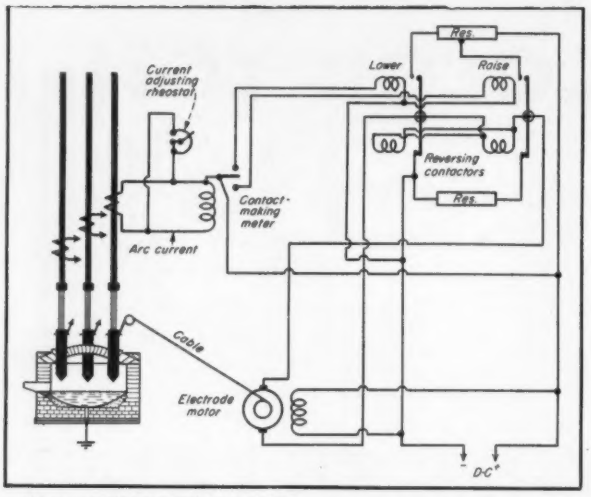



**FIG 1—CONTACT-MAKING** ammeter operates on arc-current only

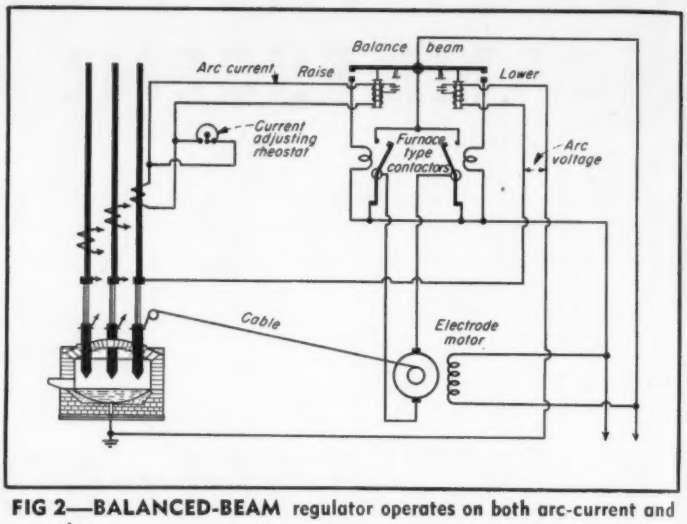



**FIG 2—BALANCED-BEAM** regulator operates on both arc-current and arc-voltage

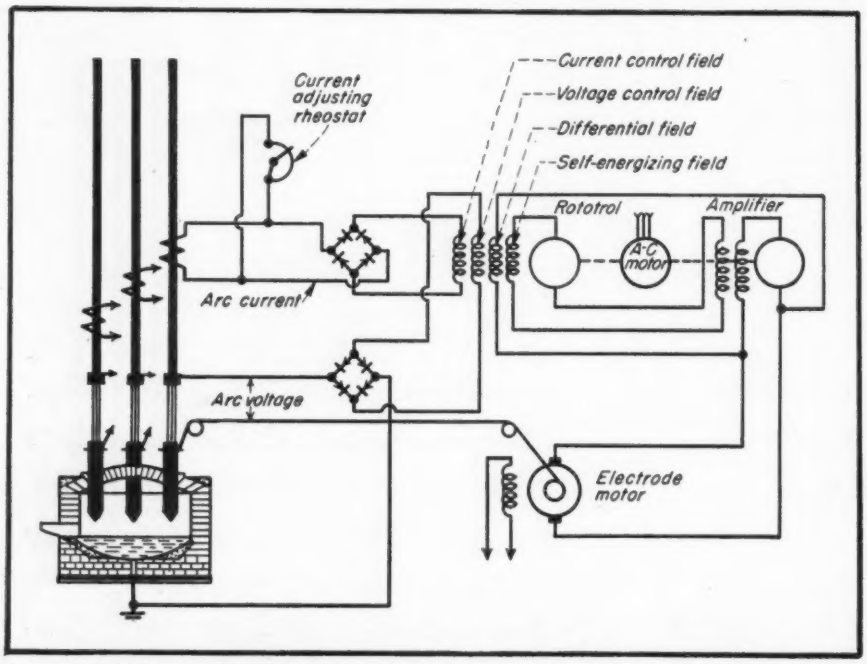
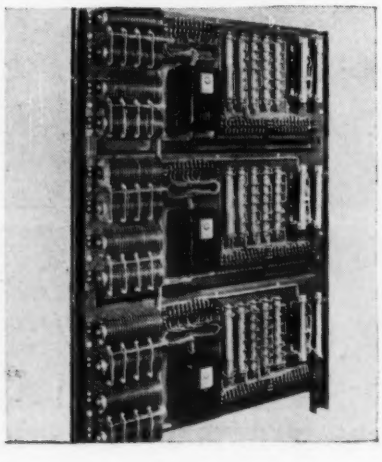
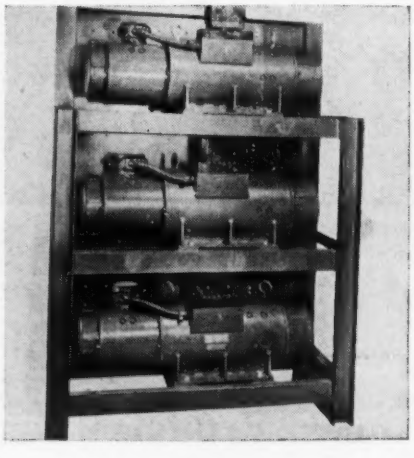



**FIG 3—ROTATING REGULATOR** Rototrol system. (Above) Schematic circuit. (Below left) Static regulator panels, one for each phase of 3 phase furnace. (Below right) Three sets of rotating machines on opposite side of regulator panels. All connections are made by the plug and receptacle shown on top of each unit






**C. E. VALENTINE**
and
**E. H. BROWNING**
Westinghouse Electric Corporation
East Pittsburgh, Pa.

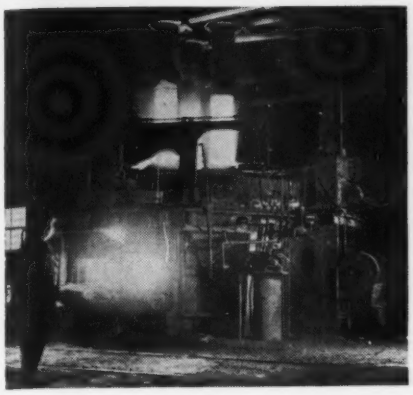

SEVERAL DIFFERENT electrical systems are used in arc furnaces to maintain a preset value of power input, as discussed in detail at the 1948 AIEE General Meeting. Throughout the furnace heat, such systems automatically change the position of the electrodes to compensate for movement of the charge and consumption of electrode material. On a recent comparative test, the rotating regulator type gave the best overall performance.

Basic types include:

CONTACT MAKING AMMETER. The current adjusting rheostat, shown in Fig 1, presets the value of arc current to be maintained. The coil of the contact-making ammeter is so energized that it makes a contact if the current is more or less than the pre-selected value. Depending upon which contact is closed, the electrode motor raises or lowers the electrodes to restore the arc-current to its correct value. This type has been largely superseded.

BALANCED BEAM. An improvement over the current-type, this system uses both arc current and arc voltages as controlling references. As shown in Fig 2, the regulating element controls contactors that apply the proper polarity to the electrode positioning motor.

ROTATING REGULATOR. The Rototrol



**TYPICAL 10,000 KVA** 3-phase, Heroult, type, arc furnace

system shown in Fig 3 also responds to electrode current and arc voltage. Static circuits compare the values from the furnace circuit. A rotating machine supplies variable voltage output of correct polarity and magnitude to the electrode motors. In a recent comparison test of 50 similar heats each, the rotating regulator gave better performance than the balanced beam type. The Rototrol showed somewhat: (1) Lower power consumption per ton of steel; (2) quicker heating; (3) smoother operation; (4) less electrode breakage; and (5) less mechanical maintenance.

ELECTRONIC REGULATORS. A few experimental electronic regulators are installed. Generally, the results are satisfactory; but more experience is necessary before they can be fairly compared with other types.

## Life of Windings on Rotating Machines—II

A. F. AYRES*
Riverside, Calif.

IT IS RECOGNIZED that the life of an electrical winding is not dependent upon the conductor itself but upon the insulation. Some operating men may feel the need of a short refresher course on insulation classification in order to analyze better data presented by utility engineers. Standards of the American Institute of Electrical Engineers indicate the following: "Class A insulation consists of cotton, silk, paper and similar organic materials when either impregnated or immersed in a liquid dielectric . . . resins . . . sheets of cellulose deriva-

*Second in a series of four on life of windings which began in Electrical World, May 22, 1948, page 152. Author is ass't electrical engineer, California Electric Power Co.

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Optional equipment includes 5 different types of ladder racks—sliding steel roof—partition trays—rubber goods compartment, etc. Call on us. Prompt deliveries.

WRITE for bulletin illustrated—it contains detailed information on both models—full specifications—tables of dimensions and weights—optional and accessory equipment. Quotations upon request.

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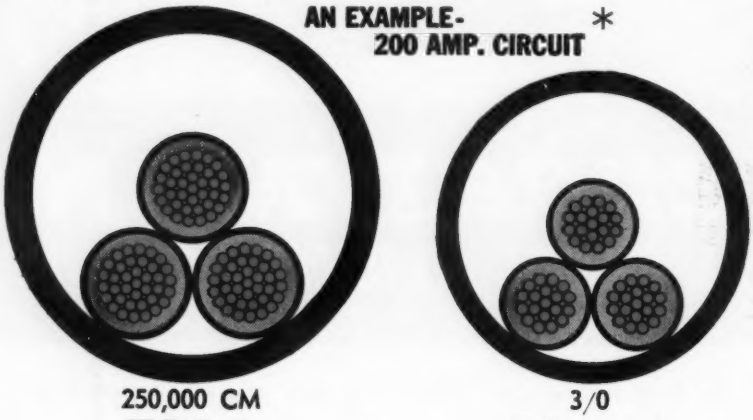
3540 WEST 140TH STREET • CLEVELAND 11, OHIO

# CRESCENT
## ENDURITE
## Type RH
*Gives Greater Current Carrying Capacity per Dollar of Installed Cost*

**AN EXAMPLE- 200 AMP. CIRCUIT ***



**250,000 CM**
**TYPE R**
Requires 2½" Conduit Maximum permissible operating temperature 60°C.

**3/0**
**TYPE RH**
Requires 2" Conduit. Maximum permissible operating temperature 75°C.

**The superior heat resistant characteristics of CRESCENT ENDURITE INSULATION with its higher permissible operating temperature and therefore greater current carrying capacity, permits the use of a smaller size of conductor, and in most cases smaller size of conduit at less cost than would be required for Type R Wire for the same load.**

**For light loads requiring small sized conductors, Voltage Drop is the determining factor in choice of wire size. Usually in sizes No. 6 AWG and heavier for power circuits or No. 1 AWG and heavier for lighting circuits, CRESCENT ENDURITE Type RH Wire & Cable gives the lowest installed cost-per-ampere of useful circuit capacity.**

***In Accordance With 1947 National Electrical Code***

# CRESCENT
## WIRE and CABLE

**CRESCENT INSULATED WIRE & CABLE CO.**
**TRENTON, NEW JERSEY**


tives . . . and enamel as applied to the conductor. Class B insulation consists of mica, asbestos, fibre-glass and similar inorganic material in built-up form with organic binding substances . . ." Lower grade Class O and higher grade Class C insulations are not included in this series of articles.

Many machine windings use a combination of both Class A and Class B insulation. That portion of the coil imbedded in the iron slot is frequently given Class B insulation, while the exposed, bent portion is given the more easily applied Class A insulation. For purposes of discussion only, such a hybrid insulation is arbitrarily being designated as Class A-B.

The maximum permissible hottest spot temperature allowance, as designated by the AIEE., is 105 deg C for Class A, and 130 deg for Class B insulation. In its discussion of this temperature limitation, the Institute indicates that the experience of the United States is such that a 40 deg C ambient is seldom exceeded. This is the equivalent of 104 deg F. It is probable that engineers in many sections of the country will not be inclined to take exception to this statement; however, those whose companies serve regions with high summer temperatures may disagree. For the last five years, during July, Blythe, Calif., for example, has averaged only three to four days in which the maximum fell below 104 deg, the average monthly July peak during that period being 115 deg.

The speed with which any insulation material deteriorates is a function of temperature and time. One authority has indicated that the rate of deterioration doubles for every 8 deg C increase in the temperature of the insulation.

## Mitigating Surface During Bushing Tests

MITIGATION of surface leakage during bushing tests under unfavorable weather conditions is important. Various methods of attacking this problem have been discussed at the Doble Engineering Co conferences of clients. At the 1948 session in Boston H. A. Walsh and R. C. Bacon of the Doble company (Belmont, Mass.) added another technique. It consists of applying a canvas hous-

# *Make Hot Line Work*
## EASIER—FASTER—SAFER with
# CHANCE
## *Aluminum Fitted*
## WIRE TONGS

- ***STRONGER***—Larger jaws, improved screw mechanism.
- ***FASTER***—Can be turned from fully open to fully closed with only 6 turns.
- ***SAFER***—Increased strength without increased weight.

CHANCE Wire Tongs, indispensable tools of particular linemen, have been redesigned and mechanically improved to make all hot line work easier, faster and safer than ever before. The use of heat-treated aluminum alloy has made it possible to design a stronger head with wider jaws and increased capacity *without increasing the weight of the tool.*

The new design takes the load off the actuating screw by means of a traveling nut that bears against a hinged jaw, minimizing the possibility of the screw bending or binding under stress.

The wider jaws give greater bearing surface, reducing the danger of damage to the conductor. The conductor cannot escape from these closed jaws, and yet there is no tight clamping action to cause injury to the line. Jaw capacity has been increased to accommodate the larger conductors now in use.

The new actuating screw makes the tool faster and easier to use, only six turns from fully open to fully closed — less than half the number required on the former design.

The laminated spruce poles used for all Chance Wire Tongs combine strength and safety with minimum weight. They are tested to resist 75,000 volts per foot.

All of these features make Chance Wire Tongs your best buy!

**"THERE'S NOTHING TOO GOOD WHERE LIFE IS AT STAKE!"**

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CENTRALIA, MISSOURI · SAN FRANCISCO, CALIFORNIA

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# KLEIN

## "Pole Master" CLIMBERS*

*Gaff is in line with the leg bone.*

## "solid comfort" for linemen

■ There's greater comfort for the lineman in the *new* Klein "Pole Master" Climbers. Designed as a real working pair . . . with one climber especially for the right and the other for the left . . . they have an extra wide stirrup for greater arch support.

Leg irons are tough and dependable, yet flexible and tapered in width and thickness. Ankles and calves get better support . . . chafing is practically eliminated. And the scientifically offset shank brings gaff in proper line with leg bone, providing real security . . . solid comfort.

"Pole Master" Climbers are forged from high quality, special alloy steel. A wrought, triangular-shaped ring at ankle assures proper set of ankle strap and provides additional comfort . . . safer, longer strap life. "Pole Masters" . . . like all Klein climbers . . . are individually tested and suitable for linemen of any weight.

***1945 POLEMASTER CLIMBERS*** Riveted Top Wrought Loop, Triangular Ring at Ankle (average weight) 2⅛ lbs. per pair. (With this Climber, use Ankle Strap No. 5301-16 or No. 5301-26).

* *Matched Right and Left Climbers*

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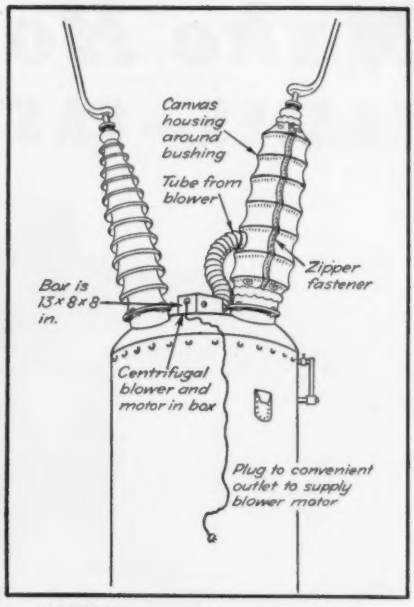

Canvas housing around bushing
Tube from blower
Zipper fastener
Bar is 13 x 8 x 8 in.
Centrifugal blower and motor in box
Plug to convenient outlet to supply blower motor

**METHOD** of applying canvas housing

ing around the bushing, designed to fit various size bushings without disconnecting the bus. A zipper fastener is provided to insure tight closing with the exception of small exhaust openings. A small motor-driven blower with about 1,200 w in heating units is connected to the housing by a canvas tube. This forces in warm or hot air and distributes it evenly in the space inside the housing. Thus the temperature of the bushing porcelain surface and surrounding air is raised.

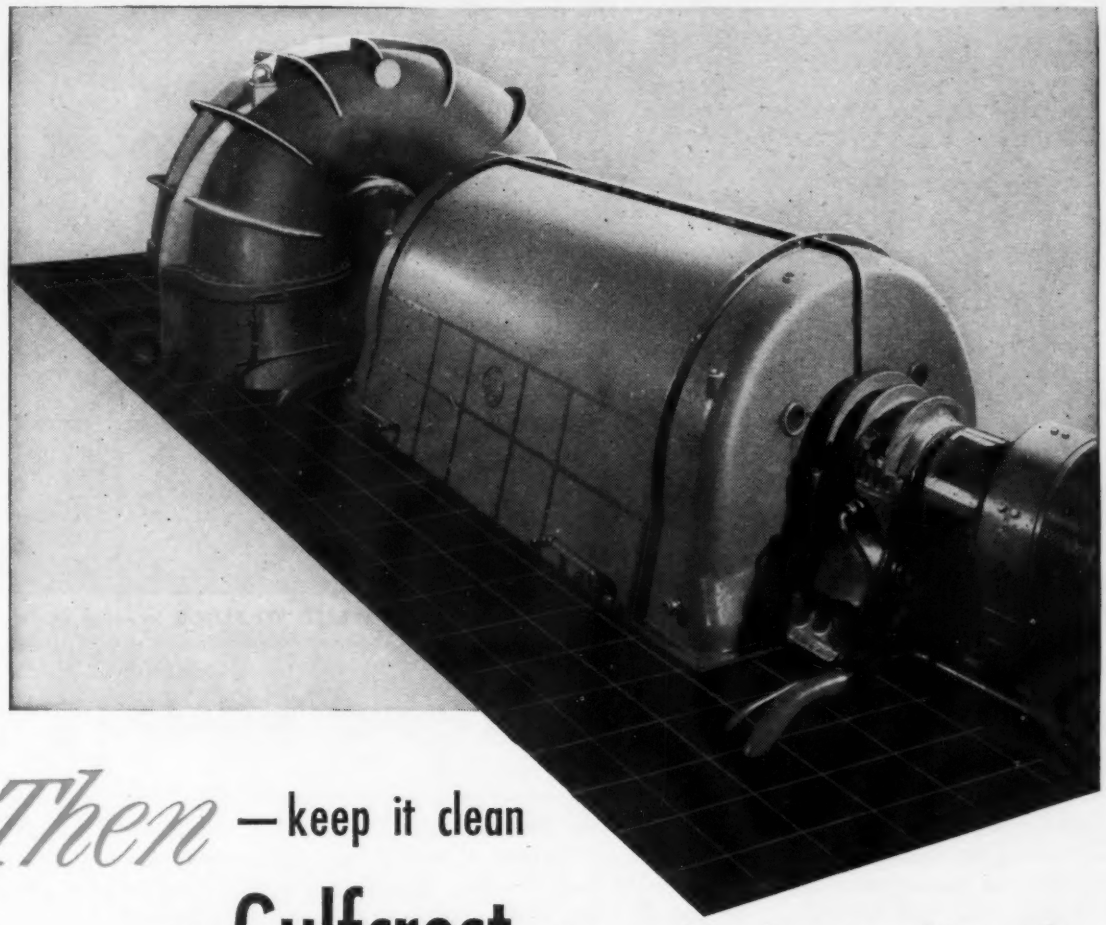
In most cases it is possible to dry the surface of the porcelain rainshed or pothead so that surface leakage is minimized. For example, a loss of 0.03 w at 10 kv was obtained for a hot collar test on a 37-kv bushing under favorable weather conditions. This bushing gave a loss of 0.46 w at 10 kv when tested at 32 F and 90 per cent humidity. The canvas housing was applied to the bushing and after 10 min. of blower operation, a loss of 0.16 w was obtained. This was reduced to 0.07 w after 35 min. total blower operation.

The time required for blower operation to cut down surface leakage to a reasonable value varies with the conditions. In extreme cases it has been found that a 30-min. blower run does no apparent good. Tests so far made indicate that they should immediately follow stoppage of the blower to prevent recontamination. In extreme cases it may be necessary to keep the blower going during the test. The test cable should always be connected in the test position before applying the canvas.

*First* — make sure the lubricating system is clean

# with Gulf Turbine Flushing Oil

- *cleans effectively*
- *protects against rust*
- *does not affect lubricating qualities of turbine oil*



*Then* — keep it clean

## with Gulfcrest, the world's finest turbine oil

BY taking these two steps, you can insure top lubricating efficiency down through the years for your new steam turbine.

The use of Gulf Turbine Flushing Oil—before the initial fill of lubricating oil — will remove grease type slushing compounds and carry away harmful abrasives which might be in the circulating system. Thus you make sure the system is clean—and avoid the possibility of trouble caused by contaminants.

For the finest lubrication — longer-lasting protection — it will pay you to investigate the advantages of Gulfcrest Oil WCR. Because of its outstanding resistance to oxidation—it's Alchlor-processed — Gulfcrest Oil WCR lasts indefinitely. With this quality oil and good operating practice, you can be sure there will be no sludge deposits in cooler tubes, bearing pedestals, or oil lines to worry about.

To get these benefits for your new turbines, call in a Gulf Lubrication Engineer today. Write, wire, or phone your nearest Gulf office.

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GULF INDUSTRIAL LUBRICATION

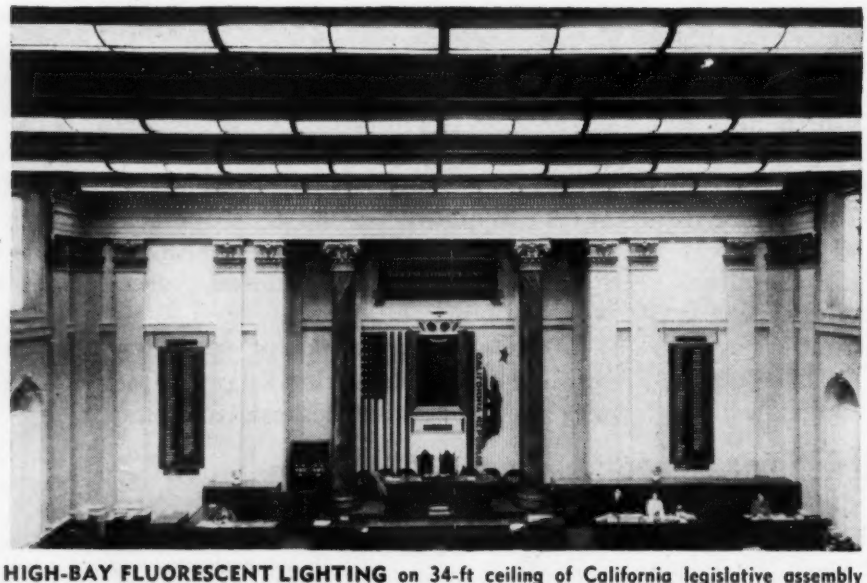
**WINCHES RAISE AND LOWER FIXTURES.** Telephone communication is provided with man on floor to control fixture position

**FIXTURE LOWERED TO FLOOR** for maintenance. Portable receptacle of Thompson hanger provides current for testing

## High Ceiling Fluorescent Proves Successful

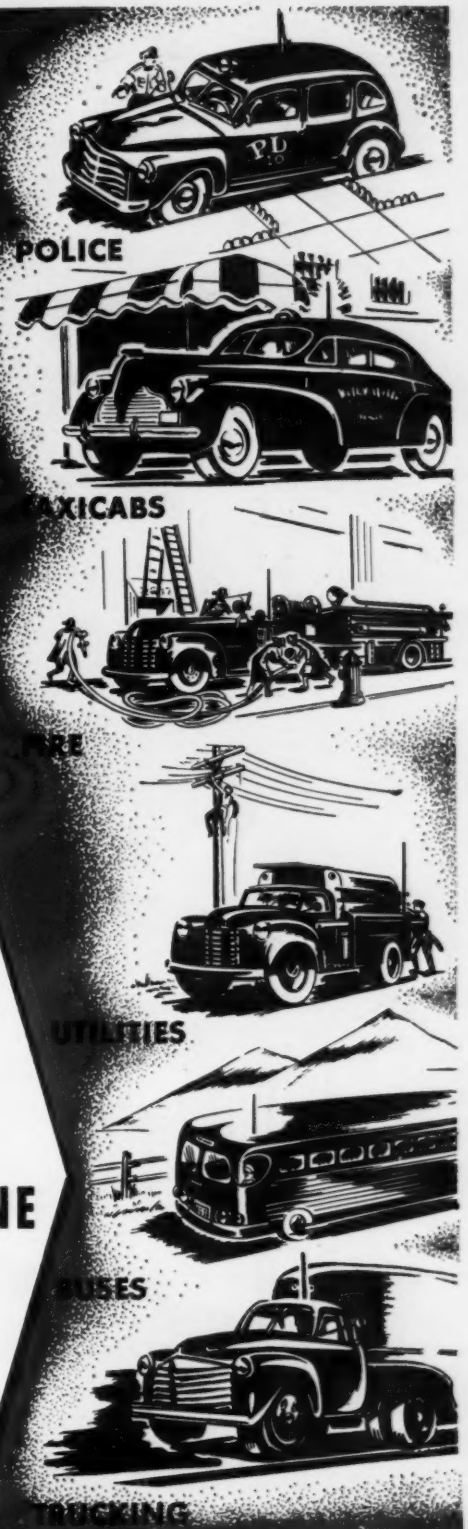
A HIGHLY EFFECTIVE application of fluorescent lighting is in the legislative chamber of the California state capitol building at Sacramento. Relighting of this room was a part of a recent modernization program.

Old lighting consisted of 12 incandescent chandeliers, 9 with 5 kw and 3 with 250 w each. The new fluorescent installation consists of six rows of units mounted directly on the 34-ft ceiling. All but the first and last rows consist of 16 sections of semi-circular fixtures. Each section has 12 standard Type F 40-w fluorescent tubes, four units of three tubes each. First and last rows are half sections of the center units. Secret of punching the light to desks over 30 ft below is the type of fixture supplied by Hub Electric Co of Chicago. It consists of a semi-circular unit with special Holophane "Controlens." Curved lens panels are hinged to permit access inside.



**HIGH-BAY FLUORESCENT LIGHTING** on 34-ft ceiling of California legislative assembly room provides 50-60 ft-c through use of prismatic lenses

Such an installation on the ceiling was made possible only by use of hangers supplied by Thompson Electric Co of Cleveland. These contact-making hangers permit 12-light sections of the heavy fixtures to be lowered to the floor for maintenance. A portable winch placed over manholes in the floor of the fourth floor of the building is used for this maintenance work. An upward pull and




*Save Time and Money...*
*Increase Operating Efficiency*
*with* **PHILCO**

## 2-WAY F-M MOBILE RADIOPHONE COMMUNICATIONS SYSTEMS

**30 to 44 Mc. and 152 to 162 Mc. Sensational new developments . . . advanced engineering . . . proven reliability . . . new operating efficiency and economy for F-M Radiophone Communications Systems, permitting clear, crisp, two-way voice communications under all conditions.**

**PHILCO**
*INDUSTRIAL DIVISION*
PHILADELPHIA 34 • PENNSYLVANIA

Philco Industrial Division Dep't JN8
Tioga and C Sts., Philadelphia 34, Pa.

Gentlemen:
Please send me information about the new PHILCO F-M Radiophone Communications Systems

NAME.....

ADDRESS.....

CITY.....

then a quick drop disengages the hangers and the fixture is then lowered. With a cable on each end of the long heavy fixture it was found necessary to provide telephone communication between a man on the floor and one at the winch to control lowering and positioning of units.

Another problem, that of having some way of testing the units on the floor after tube replacement, was solved by use of a receptacle on a portable cord. This receptacle is the same as the one at the ceiling.

Overall effect of this well-designed installation is to enhance the beauty of the room while at the same time delivering 50-60 ft-c of non-glare lighting at desk level.

## Mercury Replaces Magnetite Arcs

ONE OF THE most extensive street lighting modernization programs under way currently is the replacement of 550 magnetite arcs with high-intensity mercury-vapor lamps in Spokane, Wash. Old d-c arcs were mounted on 13½-ft standards. The bases of these now support 22-ft octoflute extension shafts with 4-ft upsweep mast arms for the new lights.

There will be 437 luminaries of the pendent type, with asymmetrical light distribution and long globes; each equipped with GE 16,000-lumen mercury-vapor FH-1 lamps. The other 113 will be horizontal-type luminaires, with asymmetrical light distribution and refracting lens globes; each equipped with Westinghouse 20,000-lumen mercury-vapor EH-1 lamps.

### Uninterrupted Service

Conversion from d c to a c is being made without interrupting lighting service. This is possible by a carefully worked out change-over circuiting arrangement. Mechanical steps include: 1) Complete dismantling of old 13½-ft lighting standard and magnetite arc control mechanisms; 2) replacing existing ⅝-in. anchor rods with 1-in. rods; 3) reaming anchor rod holes in existing bases from ¾-in. to 1⅛-in. diam; 4) resetting and leveling ornamental bases and installing IL transformers; 5) assembling luminaires, secondary circuits, glasswares, and mercury lamps on 22-ft extension

# a new Ferret Set by Snap-on

**A new design... strong... adaptable... they squeeze into close places easily**

(All units 3/8" Square Drive)
1/4" and 5/16" Single Broached Sockets
11—Double Broached Sockets from 3/8" to 7/8"
1—Speeder Wrench
1—8" Ratchet
1—Sliding Tee
1—Nut Spinner
1—Universal Joint
3", 6", and 12" Extensions
—Complete in a metal box, 19½" x 5¾" x 1⅜" — specially designed for this set. Rich red enamel finish.

Yes, a new Ferret set . . . new in design . . . way over par in performance — and they're twice as strong as you would expect such slim, slender handles and thin-walled sockets to be.

They squeeze into tight places and get those hard-to-reach nuts and bolts that defy the ordinary type wrench. Newly designed by Snap-on engineers, they make quick easy work of many of the tough jobs on modern motors and engines.

Be sure to ask your "Snap-on" man to show this set the next time he calls.

**SNAP-ON TOOLS CORPORATION**
8108-F 28th Avenue • Kenosha, Wisconsin
INTERNATIONAL DIVISION: KENOSHA, WISCONSIN, U. S. A.

# 2 new appliance testers.....

## by Simpson

**MODELS 391 and 392**

## A. C. – D. C. VOLT-WATTMETERS

***. . . for fast-simultaneous reading of volts and watts***

These two Simpson testers are designed for simultaneous reading of volts and watts. Each has two separate 3" square meters, one for volts and one for watts. Each has built-in cord and plug for connecting to line outlet, and receptacle for connecting appliance under test. There are no leads to connect. Readings register immediately when plugs are connected. Separate, uncrowded scales make quick, accurate readings easy. Each meter has two ranges, selected by separate toggle switches with positions clearly indicated by white figures recessed in the molded bakelite case. The low power consumption of these instruments and their high efficiency result in negligible loss and error in reading.

**Leatherette Carrying Case—$5.00**

**Model 391 (3000 watts max.)**
**Ranges, A.C. or D.C.**
**Volts: 0-130, 0-260**
**Watts: 0-1500, 0-3000**
**Size: 3" x 5⅞" x 2½"**
**Weight: 2 lbs.**
**Shipping Weight: 3 lbs.**
**Dealer's Net Price.....$30.00**

**Model 392 (5000 watts max.)**
**Ranges, A.C. or D.C.**
**Volts: 0-130, 0-260**
**Watts: 0-1000, 0-5000**
**Size: 3" x 5⅞" x 2½"**
**Weight: 2 lbs.**
**Shipping Weight: 3 lbs.**
**Dealer's Net Price.....$35.00**

**SIMPSON ELECTRIC COMPANY**
**5200-18 West Kinzie Street**
**Chicago 44, Illinois**
**In Canada, Bach-Simpson, Ltd.**
**London, Ont.**

**GLOBE-HOLDER** is assembled in final step of erecting new mercury lighting standards. Change-over is made without interrupting lighting service. Modernization job is being done with 22-man-hours per unit

shafts; 6) installing complete extension shaft assemblies on the reset ornamental bases; 7) changing circuits from d-c to a-c and connecting secondary lamp circuits to control transformers. Labor required for modernization is 22 man-hours per unit.

### Modernization Cost Shared

Downtown ornamental street lighting is owned by the city of Spokane. Modernization costs are borne jointly by the city and lighting districts. Lighting districts are formed by the property owners with assessment based upon number of lighting units and footage. The city pays 25% of the lighting costs and the property owner 75%. The Washington Water Power Co contracts with the city for the operation and maintenance of these districts. In cases of new installations or modernization, the company has contracted to finance the installation of equipment and amortize the costs over a 10-year contract period.

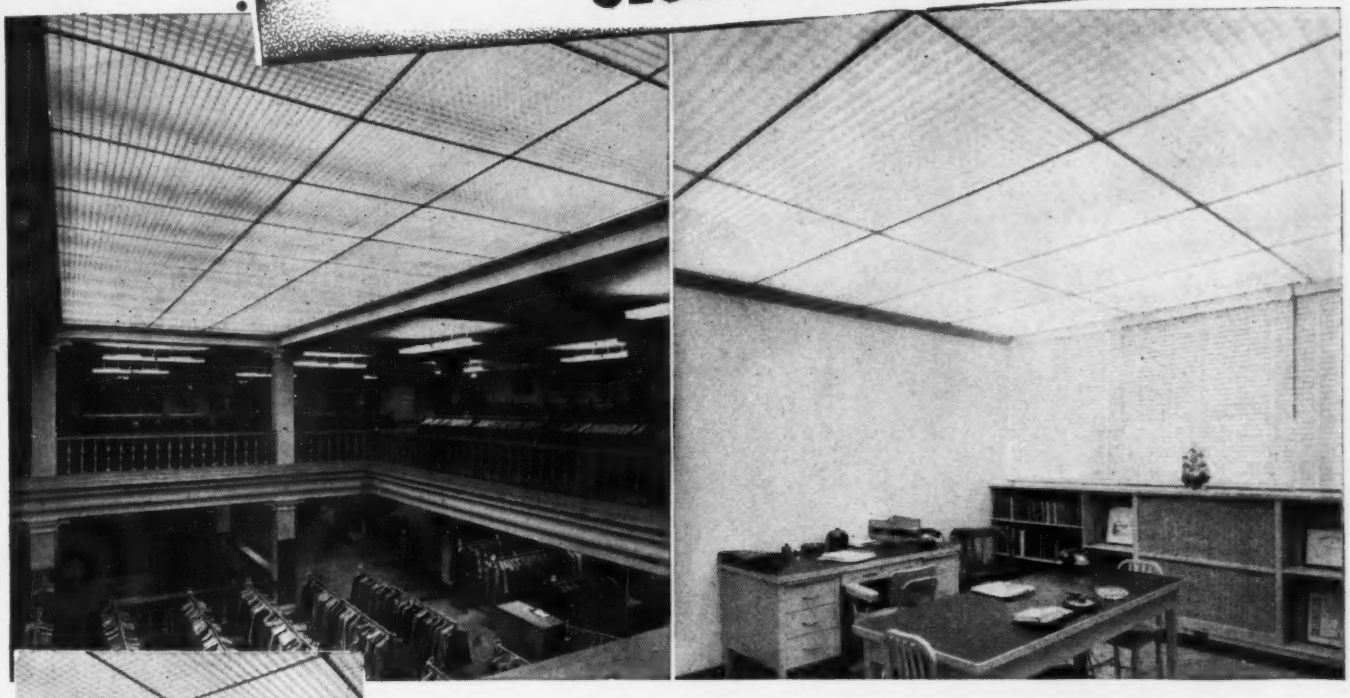
### Payment Rate

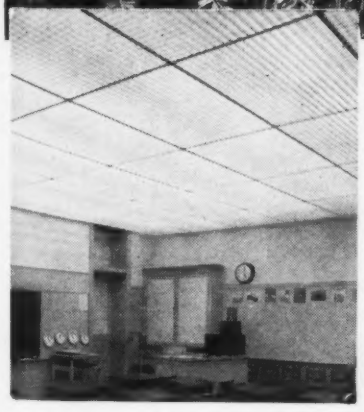
Payments to the company on these contracts are based upon three elements: 1) Energy at 6 mills per kw hr; 2) attendance, lamp renewal and maintenance; 3) amortization of investment for modernization of the equipment. Present contract rate during the amortization period is as follows: $60 per yr for the 16,000-lumen mercury-vapor unit, and $70 per yr for the 20,000-lumen mercury-vapor unit.

**brings not only MORE LIGHT** *without annoying glare* *

**...but a NEW experience in SEEING!**

## ...the ceiling that actually GLOWS WITH LIGHT!





## for schools — stores — offices

**High levels of illumination... 100—120—130—or more footcandles... but only a light meter would know it! That is the miracle of Sky-Glo... high levels of illumination without awareness of the fact! Ease of seeing... without awareness of the reason —so restful... unobtrusive... and stimulating is Sky-Glo lighting!**

**SKY-GLO IS A SYSTEM OF VINYLITE LOUVERS, CHANNELS AND FITTINGS** ... that make possible ceilings which glow with light. For rooms old and new. Expensive ceiling alterations are unnecessary as Sky-Glo can be installed below the ceiling, at any point from 8'6" above floor. Vinylite is a product of Bakelite Corp.; has a light transmission factor of 71%.

Sky-Glo cannot be described. You must actually be present in a Sky-Glo illuminated room. Then, only, can you appreciate the statement that Sky-Glo makes possible a new experience in seeing! Then, only, can you *see* what a *difference* there is between a glowing ceiling of light and individually hung light sources.

READY, NOW, is the Sky-Glo "Bulletin SC"... the book that tells why Sky-Glo is one of the most significant developments in fluorescent lighting... in terms of lighting performance ... in terms of installation... application... modernization... maintenance! Mail the coupon for your free copy.

* *At 130 footcandles, ceiling brightness is less than 1 candle per sq. in. (452 footlamberts).*

SEE OUR EXHIBIT
STORE MODERNIZATION SHOW
JULY 6th to 10th
Grand Central Palace
NEW YORK CITY

**BENJAMIN**
TRADE MARK
*Sky-Glo*
LUMINOUS LOUVERED LIGHTING SYSTEM

Distributed Exclusively Through Electrical Wholesalers

BENJAMIN ELECTRIC MFG. CO.
Dept. K, Des Plaines, Illinois

Send, without cost or obligation, copy of Sky-Glo "Bulletin SC", just off the press.

Name.....

Company.....

Address.....

City.....State.....

B-2661

**NORTH • EAST • SOUTH • WEST • IT'S SCHRAMM**

*The Air Compressor You Like to Operate*

**compact** . . . no waste space, compressor and engine coupled into a single, rigid, permanently aligned unit . . . balanced to reduce wear and increase efficiency!

**lightweight** . . . Portables designed for quick handling to and from the job, stationary units vibrationless.

**easy to start** . . . Just push the built-in electric starter, and the Compressor starts . . . to give you a continuous amount of air.

**TOOLS FOR THE JOB**

Schramm Inc. also has a complete line of Pneumatic Tools to offer and recommend for operation by their Compressors.

These include Rock Drills, Paving Breakers, Trench Diggers, Clay Spades, Backfill Tampers, Tie Tampers, Sheeting Drivers, Demolition Tools, Chain and Circular Saws.

Write for bulletins and prices.

. . . For these reasons users of Schramm Air Compressors have said they *like* to operate both stationary and portable Schramm units.

Other features, however, enter into the usefulness of Schramm. There's 100% water cooled feature, allowing you to operate Schramm perfectly both summer and winter; mechanical intake valve, forced feed lubrication, to mention a few.

Schramm features make them the Air Compressors ideal for your many jobs . . . and the reasons they're specified North, East, South and West. Write today for data.

**SCHRAMM INC.**

**THE COMPRESSOR PEOPLE • WEST CHESTER • PENNSYLVANIA**


## Hotpoint Conducts "Chef's School"

INTENSIVE TRAINING in use and servicing of counter and pantry, and heavy-duty commercial cooking equipment was given to 80 salesmen and service men in the demonstration kitchen of the Union Electric Co of Missouri recently. The 5-day course, conducted by Hotpoint, Inc, with the assistance of utility personnel, was comprised of lectures and class instructions on methods to improve customers' food service operations. Feature of the course was actual food preparation by each "student", making use of top-cooking, oven and deep-fat frying equipment. One special session on servicing was included for utility trouble men, for manufacturers' service men, and for maintenance employees from hotels, schools, hospitals, cafeterias and department stores. A number of St. Louis architects were guests at the final session which was devoted to food service engineering and kitchen layout.

## Fair Stars Farm Kitchen

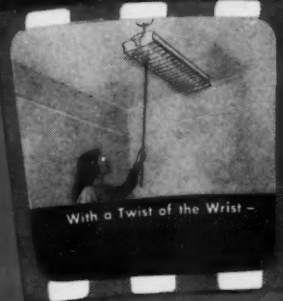
SOME 200,000 people recently saw a modern farm kitchen in action at the Eastern State Exposition in Springfield, Mass., where home service directors supervised the preparation of meals by 4-H girls from the several states. Passers-by could see cooking, dish-washing, refrigeration and other units in action.

A "utility room" adjoining contained a 10-cu-ft deep-freeze outfit, electric water heater, ironer and washer. This "live" exhibit attracted wide interest in comparison with the usual "run-of-mine" displays of such equipment. The Farm Electrification Committee of the New England Council was in charge of the project.

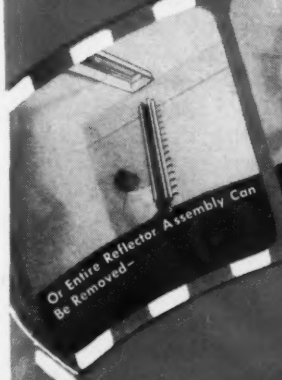
*The Amazing New and Different*

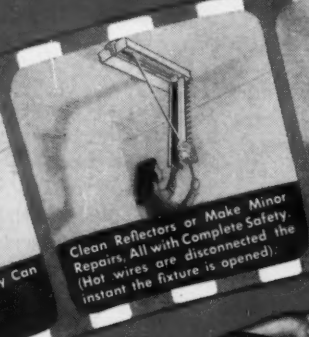
# Guthlite*

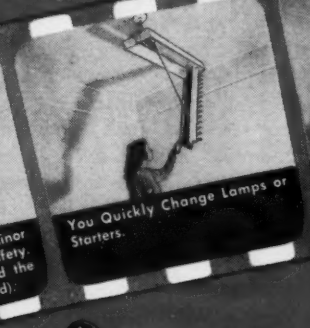
## FEATURES FAST, SAFE, EASY "JACKNIFE" MAINTENANCE!

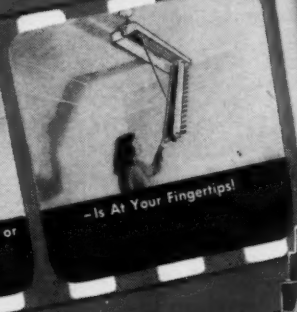

With a Twist of the Wrist –

EVERYTHING — Lamps, Starters, Reflectors, Louvres, Ballast, Wiring


Or Entire Reflector Assembly Can Be Removed –


Clean Reflectors or Make Minor Repairs. All with Complete Safety. (Hot wires are disconnected the instant the fixture is opened).

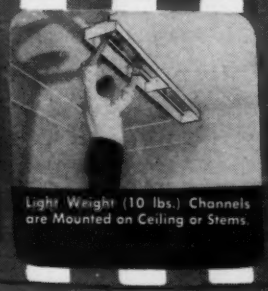

You Quickly Change Lamps or Starters.

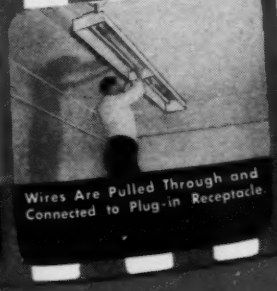

– Is At Your Fingertips!

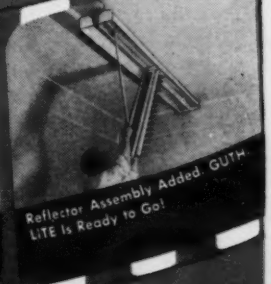
**The Exclusive GUTH "JACKNIFE" HINGE Makes This Revolutionary New Fixture Possible**

For Thorough Washing!

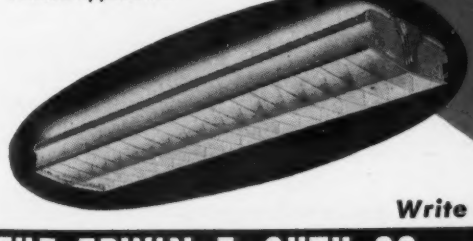
**GUTH-LITE Installation Is Simple, Quick, Economical!**


Light Weight (10 lbs.) Channels are Mounted on Ceiling or Stems.


Wires Are Pulled Through and Connected to Plug-in Receptacle.


Reflector Assembly Added. GUTH-LITE Is Ready to Go!

*Trade Mark.
U. S. & Canadian
Patents Applied For



***GUTHLITE . . . for Better Sight***

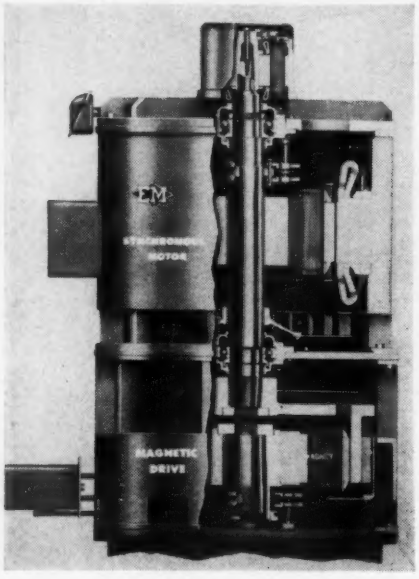
**The GUTHLITE provides efficient down light, comfortably pleasing ceiling light, and beautiful, "radiant glow" soft lighted sides. There is no glass used in the fixture — and no horizontal light-reflecting surfaces to gather dust.**

***Write Today for Full Details Ask for Bulletin No. 2845E***

**THE EDWIN F. GUTH CO. · ST. LOUIS · *Leaders in Lighting Since 1902***

Guth

# NEW EQUIPMENT




## Vertical Motor Drive

A "VERTICAL synchronous motor magnetic drive unit" has been developed to give smooth adjustable speed control for centrifugal pumps. It is a product of Electric Machinery Mfg Co, Minneapolis 13, Minn.

Motor drives the ring of the magnetic drive at constant speed. Magnet member of magnetic drive mounted on gear shaft operates the pump at speed required by liquid level control.

Unit is said to offer wide-range speed control, precludes "hunting" and eliminates frequent motor starts and stops. Illustration shows 250-hp, 1200-rpm vertical synchronous motor magnetic drive unit, which operates 200 rpm vertical sewage pump through a reduction gear.

•

## Germicidal Sterilamp

A 25-W GERMICIDAL sterilamp of the slimline type has been made available by the Lamp Division, Westinghouse Electric Corp, Bloomfield, N. J. The 36-in. long lamp is said to emit more than twice as much ultraviolet radiation as any lamp heretofore available. It is designed for starterless operation and will operate in any position.

Characteristics include: Designation, G36T6; rated watts, 25; lamp current, 100, 200 or 300 ma depending on rating of ballast; minimum open-circuit voltage, 600; rated average life; 6000 hr (12 hr per start); maximum intensity (2537A) microwatts per sq cm at one meter at 200 ma, 95; ultraviolet output at 2537A, 8.5 w; auxiliaries, same as for 64T6 Slimline fluorescent lamp.

•

## Feedwater Heater

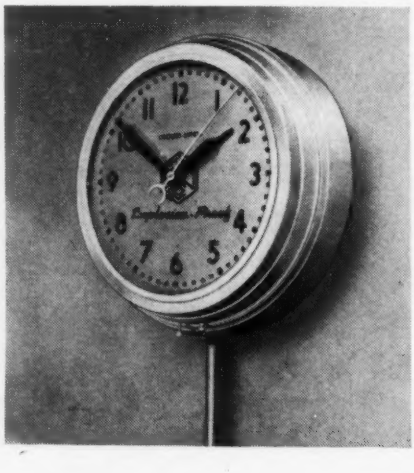
ELIMINATION OF the customary vent condenser from a deaerating feedwater heater has been accomplished in a new design recently announced by Elliott Co, Jeannette, Pa. An inlet spray assembly and a simply designed vent collecting hood do the work of the many small tubes and other parts comprising the vent condenser formerly used.

All parts in the heating section, except the non-ferrous inlet spray assembly, are stainless steel. Trays, inlet spray assembly and access opening cover are the only removable parts in the entire unit, other parts being permanently welded to the shell since they require no maintenance or adjustment. Performance guarantees on the reaerating heater are 0.005 milliliter per liter oxygen on the multiple tray compartment type and 0.03 ml/l on the single tray compartment type.

•

## Electric Clock

DESIGNED for use in hazardous locations, an electric clock, type TCH, has been announced by Crouse-Hinds Co, Syracuse, N. Y. In general, the appearance is similar to the usual electric wall clock. It has a 13-in. dial, an outside diameter of 17 in., a sweep second hand, and an external setting knob.



## Portable Potentiometer

A NEW PORTABLE potentiometer for precise measurements of very low voltages has been announced by the General Electric Co, Schenectady 5, N. Y. The potentiometer is designed for checking temperature-measurement instruments and for the testing of rotating machines, ovens, furnaces, oil-burners, steam-driven equipment, and air-conditioning units.

Equipment includes standard cell, working batteries and rheostats for adjusting the current through the potentiometer circuit.

The galvanometer, which is not built in, is furnished with a built-in transformer so the galvanometer lamp may be operated from 115-v, a-c supply lines. But if field conditions dictate, the lamp may be operated from four No. 6 dry cells.

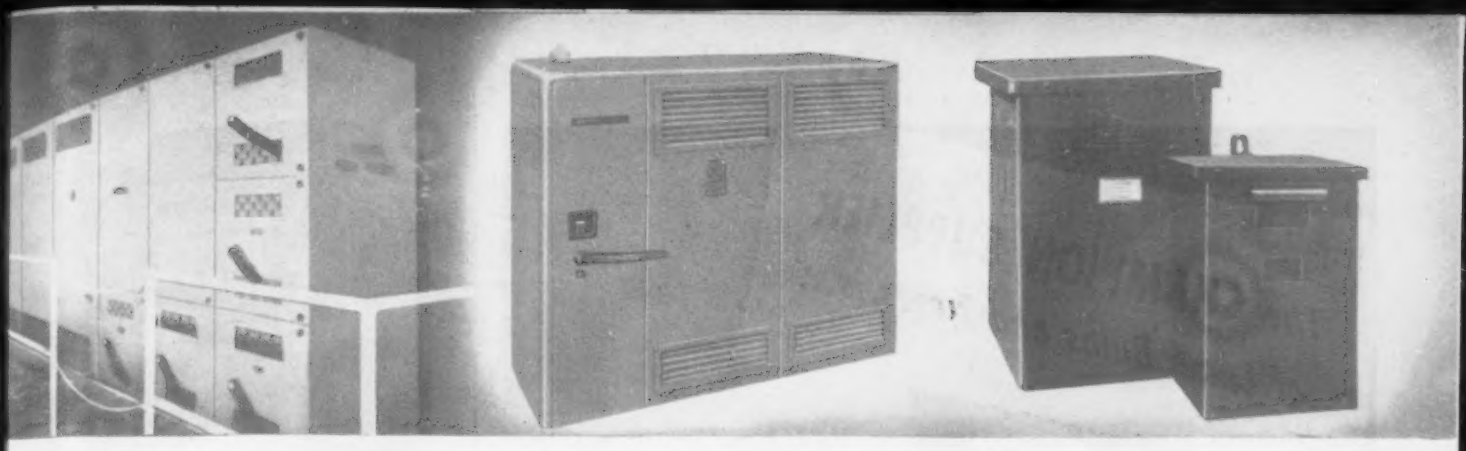
This potentiometer has two ranges, 0-60 and 0-6 mv. The voltage to be measured is read on two dials, with each step on the first dial being 0.2 mv, and each division on the second dial, 0.001 mv. Additional information is available in bulletin GEC-256.

•

## Speed Recorder

A SPEED AND production recorder, model R-300-H, has been announced by Electric Tachometer Corp, 22nd and Vine St, Philadelphia, Pa.

The unit consists essentially of a synchronizing contactor for attachment to prime mover or industrial machine. A step-by-step motor is electrically con-



# use the Westinghouse
# CSP Power Transformer
## a single feeder substation

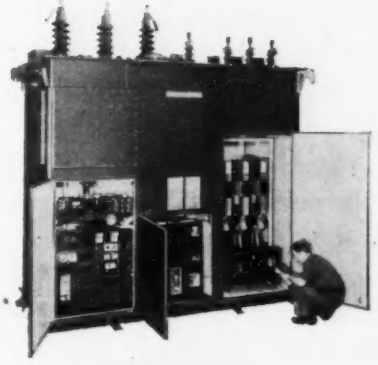
You can get the latest and best in substations without the bother of building them yourself, handicapped by today's trying conditions. This is an advantage leading utilities the country over are enjoying . . . those that have adopted CSP "packaged power" transformers. More than 450 of these Completely-Self-Protecting single feeder substations are in service or on order.

The CSP, a fully engineered and coordinated factory-built unit will serve you as it is serving others.

- **Saves installation time and labor.** Move the CSP to location and connect. No steel work to build; little foundation to prepare.
- **Simplifies purchasing.** You select, order, receive, handle and pay for only one piece of equipment instead of many.
- **Can be moved easily** when relocation becomes necessary; always has 100% "salvage" value.
- **Is small and safe.** Occupies only one third the space for a conventional substation; is fully enclosed.
- **Is Completely-Self-Protecting (CSP).** Gives complete protection to all elements—transformation, regulation, metering and control.
- **Saves operators money** with the advantages listed above, plus lower maintenance.
- **Makes an attractive neighbor** in residential districts; is readily landscaped.

Recent developments, some of which are listed on the opposite page, add even further to the advantages you gain by using the CSP. All these factors combine to make the CSP power transformer the best solution to many of your distribution problems of today.

For complete information, call your Westinghouse Office, or write Westinghouse Electric Corporation, Transformer Division, Sharon, Penna. J-70507

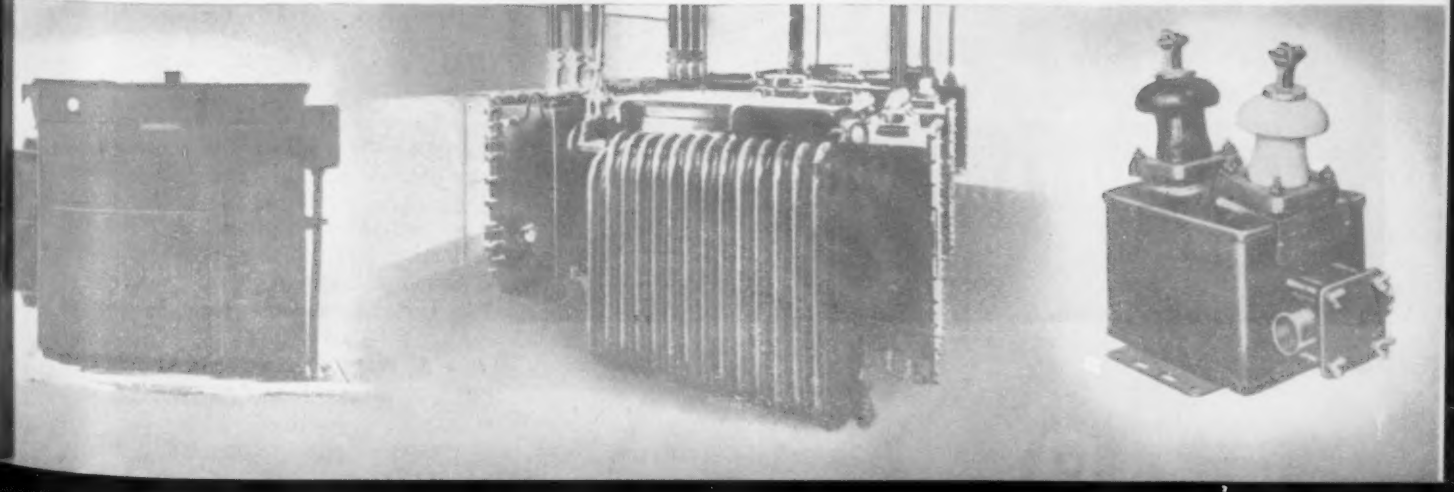


This 1,000-kva CSP power transformer enables its operator to follow profitably the trend toward rural and residential distribution at higher voltages. With a new air circuit breaker, it has 12,000 volts on the low side.

**Westinghouse**

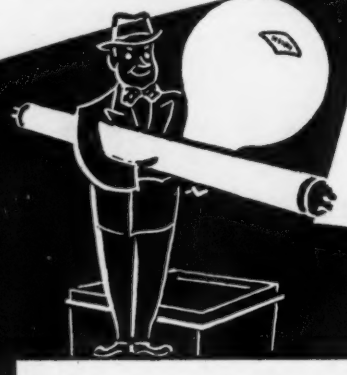
PLANTS IN 25 CITIES . . . OFFICES EVERYWHERE

*"LEADERSHIP IN TRANSFORMER DEVELOPMENT . . . FOR EVERY POWER DISTRIBUTION JOB"*



The CHAMPION SUPPLIER of Lamp Bulbs and Tubes is...

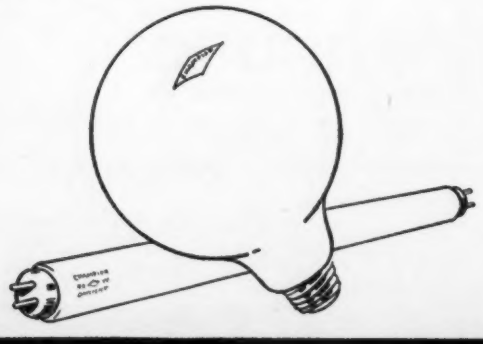
YOUR LOCAL ELECTRICAL OR INDUSTRIAL SUPPLY HOUSE



You save time, money and trouble when you buy CHAMPION **Fluorescent** and *Incandescent* Lamps the same way you buy other supplies—from the house that takes care of your everyday needs.

The CHAMPION Lamp distributor nearest you has been selected because it is *his* business to provide prompt, intelligent industrial supply service in the same way that it is *our* business to provide high quality, long lasting, low cost industrial lamps. Champion's trained lighting experts in the field are at all times available to help you make the most of lamps and lighting.

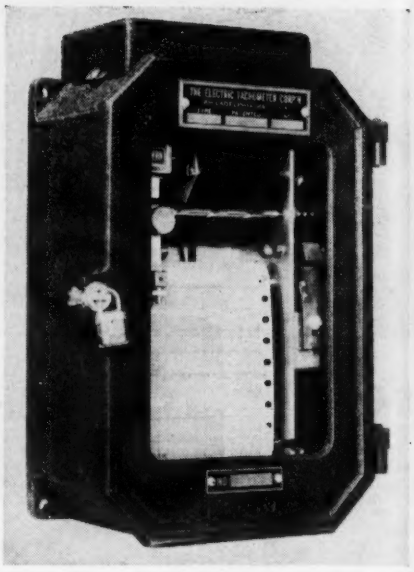
Try this easy way to get good lamps and good service. Order from your regular supply house and specify *Champion*.



CHAMPION LAMP WORKS

*Lynn, Massachusetts*

A DIVISION OF CONSOLIDATED ELECTRIC LAMP CO



nected to the contactor and follows its motion. Through gears and feed screw the motor drives a steel stylus across a wax-coated chart. At one-half minute intervals the pen arm is restored to zero. The chart is fed downward at 2 in. per hr. In the series of parallel lines, the length is proportional to speed or production and the ends form a speed curve.

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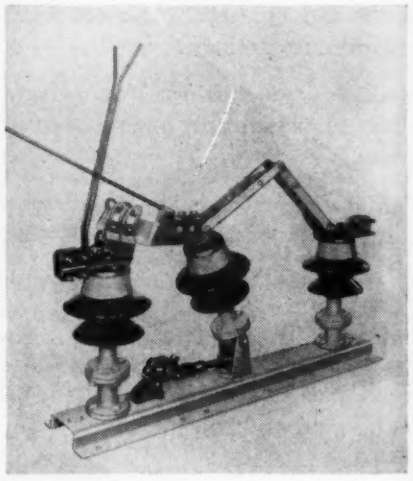


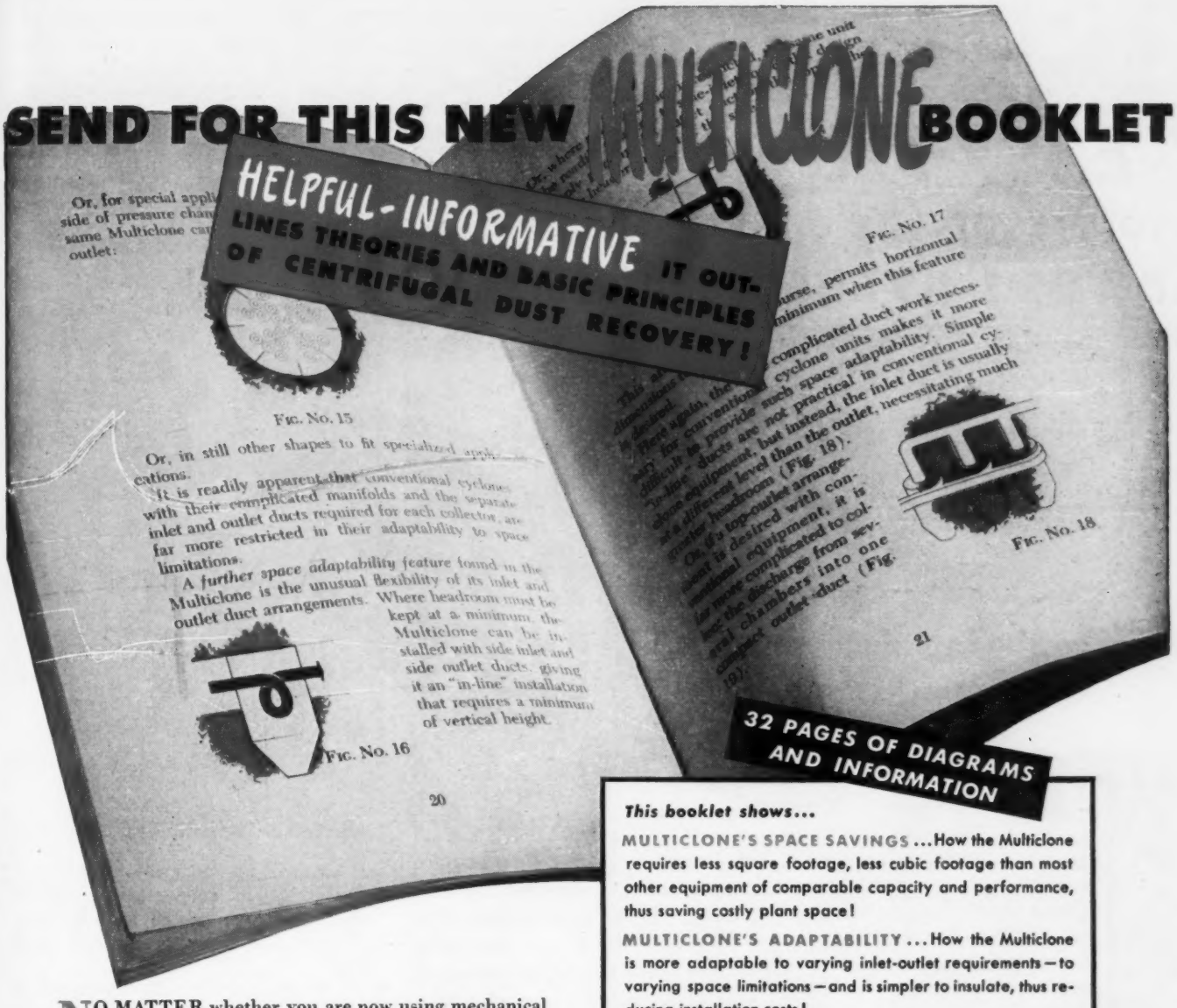
## Disconnect Switches

GROUP-OPERATED tilting insulator switches manufactured by the A. B. Chance Co, Centralia, Mo., have been redesigned to increase their ease of installation and operation. Designated types WN and VN, the switches are manufactured for voltages from 7.5 to 34.5 kv and in ratings of 200 to 600 amp.

Features of the new design are reversible terminal caps to accommodate a variety of cable and tubing sizes; flanged channel-iron base reported not to cut into wood cross arms; and full floating, self-aligning clips to assure ease of operation.

Terminal clamps take ½ in. or

# SEND FOR THIS NEW MULTICLONE BOOKLET




32 PAGES OF DIAGRAMS AND INFORMATION

NO MATTER whether you are now using mechanical dust recovery equipment or are planning the installation of such equipment at some future date, here is a booklet just published that is full of helpful and valuable information on centrifugal dust recovery. It not only explains the basic methods and principles involved, but also shows the important differences between small and large diameter separating tubes, shows how to simplify your duct work and reduce installation costs, and outlines many other important factors to be considered in selecting mechanical dust recovery equipment.

In addition, this informative booklet illustrates and explains how MULTICLONE'S unique *vane* design is fundamentally different... how it makes possible greater compactness, simpler installation, high recovery of the small particles as well as the medium and coarser ones, and many other facts on MULTICLONE advanced design.

A limited supply of these booklets is available for free distribution to those interested in mechanical recovery equipment and methods. Write for your copy today.

***This booklet shows...***

**MULTICLONE'S SPACE SAVINGS** ...How the Multiclone requires less square footage, less cubic footage than most other equipment of comparable capacity and performance, thus saving costly plant space!

**MULTICLONE'S ADAPTABILITY** ...How the Multiclone is more adaptable to varying inlet-outlet requirements—to varying space limitations—and is simpler to insulate, thus reducing installation costs!

**MULTICLONE'S EFFICIENCY** ...How Multiclone's multiple *small diameter* tubes, made possible by its exclusive *vane* design, give higher centrifugal forces and more complete cleansing of *all* suspended particles—even small ones of 10 microns and less!

**MULTICLONE'S LOW MAINTENANCE** ...How the Multiclone has no high speed moving parts to repair or replace, no pads or filters to clean or renew, nothing to choke gas flow or increase draft losses as suspended materials are recovered. Multiclone draft losses remain uniformly low—recovery efficiencies uniformly high—at all times!

**Make sure that a copy of this new booklet is in your reference files by sending for your copy now!**

COTTRELL Precipitators
MULTICLONE Collectors
TURBULAIRE Spray Dryers

WESTERN Precipitation CORPORATION

ENGINEERS, DESIGNERS & MANUFACTURERS OF EQUIPMENT FOR COLLECTION OF SUSPENDED MATERIALS FROM GASES & LIQUIDS

*Main Offices:* 1004 WEST NINTH STREET, LOS ANGELES 15, CALIFORNIA
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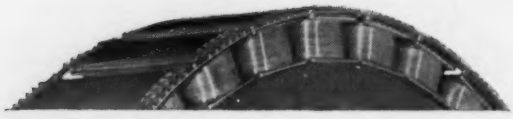
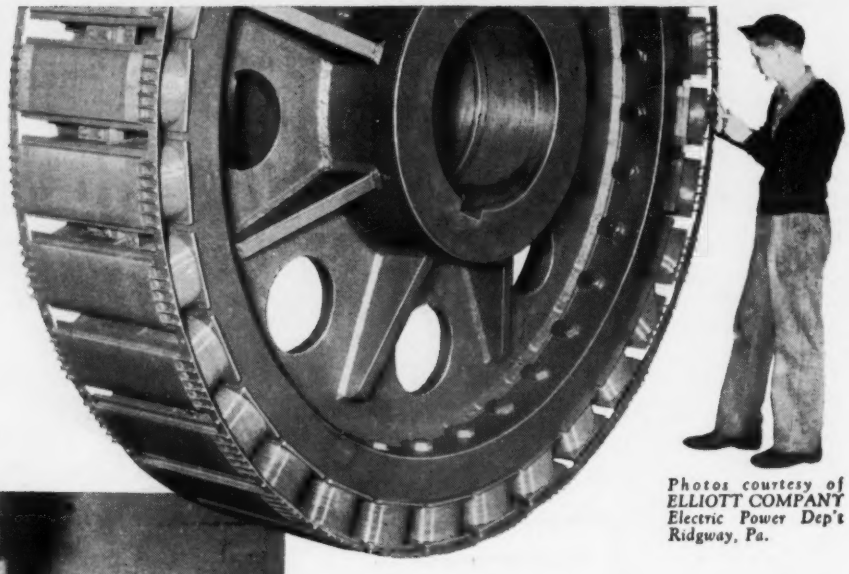
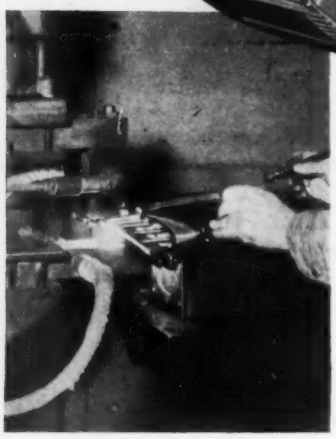


# EASY-FLO helps build the rotors of the new Elliott FABRI-STEEL generators



Photos courtesy of ELLIOTT COMPANY Electric Power Dep't Ridgway, Pa.



Here's the brazing set-up. Resistance heating is used. Elliott reports uniform results and consistently strong, enduring joints.

EASY-FLO is used to braze copper damper bars to copper end ring segments. Elliott uses EASY-FLO for the same reasons that so many other electrical manufacturers do. They have found this low-temperature silver brazing alloy makes joints that have the strength and ductility to take all the vibration, shock and temperatures the solid metals can withstand—joints that have high conductivity and strong resistance to corrosion. And they have learned that EASY-FLO'S low-working temperature and extreme fluidity are big time, heat and labor savers. "Results" says Elliott, "have been excellent."

FOR SPEED, RELIABILITY AND ECONOMY in brazing, EASY-FLO stands alone. BULLETINS 12-A and 15 will give you the full details plus useful metal joining information. Write for copies today.

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*Agents in Principal Cities*


¾ in. I.P.S. tubing or from No. 4 to 600,000 cir mil cable. Independent rockershaft principle is said to insure no slam in closing, and makes for easy installation because the operating shaft can be led into the bearings after the switch units have been mounted. All bearings are Oilite bushed. Additional information is given in Bulletin SW 11-47.

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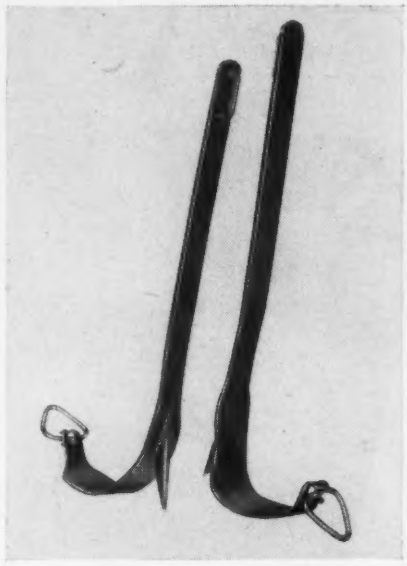


## Matched Climbers

A NEWLY DESIGNED set of climbers of matched right and left units, called Pole Master, has been announced by Mathias Klein and Sons, 3200 North Belmont Av, Chicago 8, Ill.

The units have been developed to give dependable security and more lasting comfort to the lineman. They have extra wide stirrups to give greater arch support. Leg irons are constructed with taper and are flexible to eliminate chafing of ankles and calves. Shank is offset to bring gaff in proper line with leg bone. Wrought iron ring is triangular in shape to minimize strap wear.

•

## A-C Timing Relay

DEVELOPMENT OF Bulletin 362 motor-driven time delay relay with composite connections has been announced by Ward Leonard Electric Co, Mount Vernon, N. Y. The relay is designed for use in processing, machine tool, signal, sound and other control equipments or systems. They are applicable where an adjustable time delay, after closing the pilot circuit, is required for remote, automatic or sequential operation.

Essentially the relay consists of a synchronous motor, a differential gear system, a brake assembly, a trip

# New GarWood Reel-Rite WINCH

*Reeving diagram. Line from load to automatic tension device, to automatic spooling unit, to drum.*



There are important new benefits for the winch user in the exclusive patented features of the new Gar Wood Reel-Rite Winch. Cut maintenance costs by increasing cable life. Eliminate delays caused by broken cable. Reduce your occupational hazards with a winch that is really safe. Whether slack or under load, the winch line spools on the drum in closely coiled, even layers by being automatically led back and forth across the drum while under automatic tension. No piling up or bunching of coils . . . no loose coils. No crushing of rope or cutting and breaking of strands due to uneven winding.

The Reel-Rite Winch also has the advantages found in other Gar Wood Winches: detachable back draft clutch, automatic safety brake, patented flexible suspension . . . and many more.

**WRITE FOR NEW BULLETIN NO. WC-201A**
**that gives the advantages, operation, dimensions and rating of the new Gar Wood Reel-Rite Winch.**

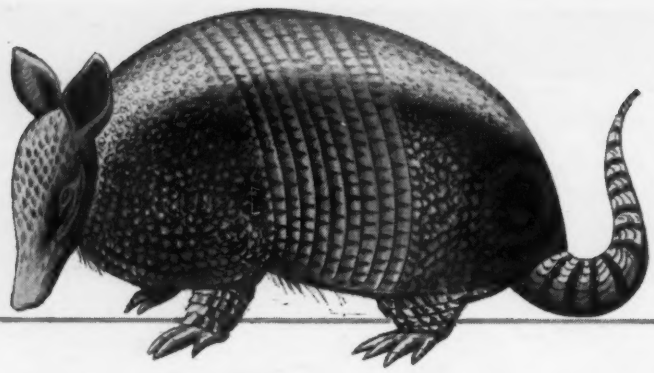
*See all the improved Gar Wood Products at the Road Show*

GAR WOOD GW INDUSTRIES

## GAR WOOD INDUSTRIES, INC.

WAYNE DIVISION, WAYNE, MICHIGAN

OTHER PRODUCTS—HOISTS • DUMP BODIES • CRANES • TANKS • TRACTOR EQUIPMENT
SCRAPERS • TRUCKS • SPREADERS • TRUCK PATROLS



"Blocks and sheaves, too, need *armored construction!*"

● Think what today's bigger, heavier equipment does to your blocks and sheaves. Greater strains . . . faster sheave speeds . . . harder knocks . . . terrific wear and tear on shells, hooks, shackles, pins and axles! To meet these new needs, AMERICAN Blocks and Sheaves are built with *armored construction*. Heavy steel side plates and straps. Tough forged steel wherever needed. *Extra* strength, *extra* ruggedness, *extra* serviceability. AMERICAN Blocks and Sheaves, made for wire rope only, come in many types and sizes from 1½ to 250 tons capacity. Your distributor has them in stock.

only "American" Blocks and Sheaves have ***armored construction***

Thick steel side plates, extended beyond sheave flanges, prevent breakage
Heavier pins and axles
Tough steel reinforcing straps
Sheaves of hard iron or alloy steel . . . thick flanges, precision shaped grooves
Self-lubricating bushings, bronze bushings, or anti-friction bearings
Oversize forged steel hooks and shackles

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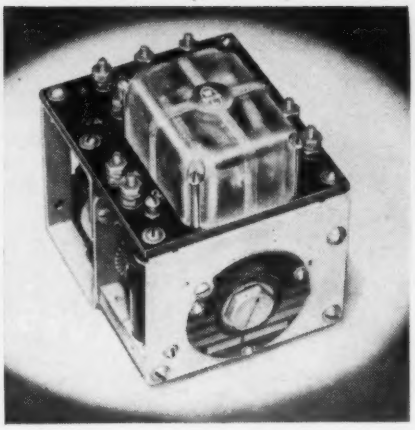
*Genuine* **CROSBY CLIPS**

For fastening wire rope, use genuine CROSBY CLIPS—Made of highest quality drop-forged steel, hot dip galvanized. To make sure you get genuine CROSBY CLIPS, look for the famous Red-U-Bolt. All sizes—⅛ to 3 inches. Distributors everywhere.

**AMERICAN HANDIWINCH**

Gives one man the power of a crew. HANDIWINCH weighs only 95 lbs. Can be carried and set up anywhere; handles lifting, loading and pulling jobs up to 5 tons. All steel construction, cut gears. Ask your distributor.

switch assembly, a terminal board and an auxiliary relay. Features include: composite connections (instantaneous or maintained contact operation), timing adjustable up to 63 min maximum immediate self-recycling, and quick make and break load-circuits.

•

## Fluorescent Fixtures

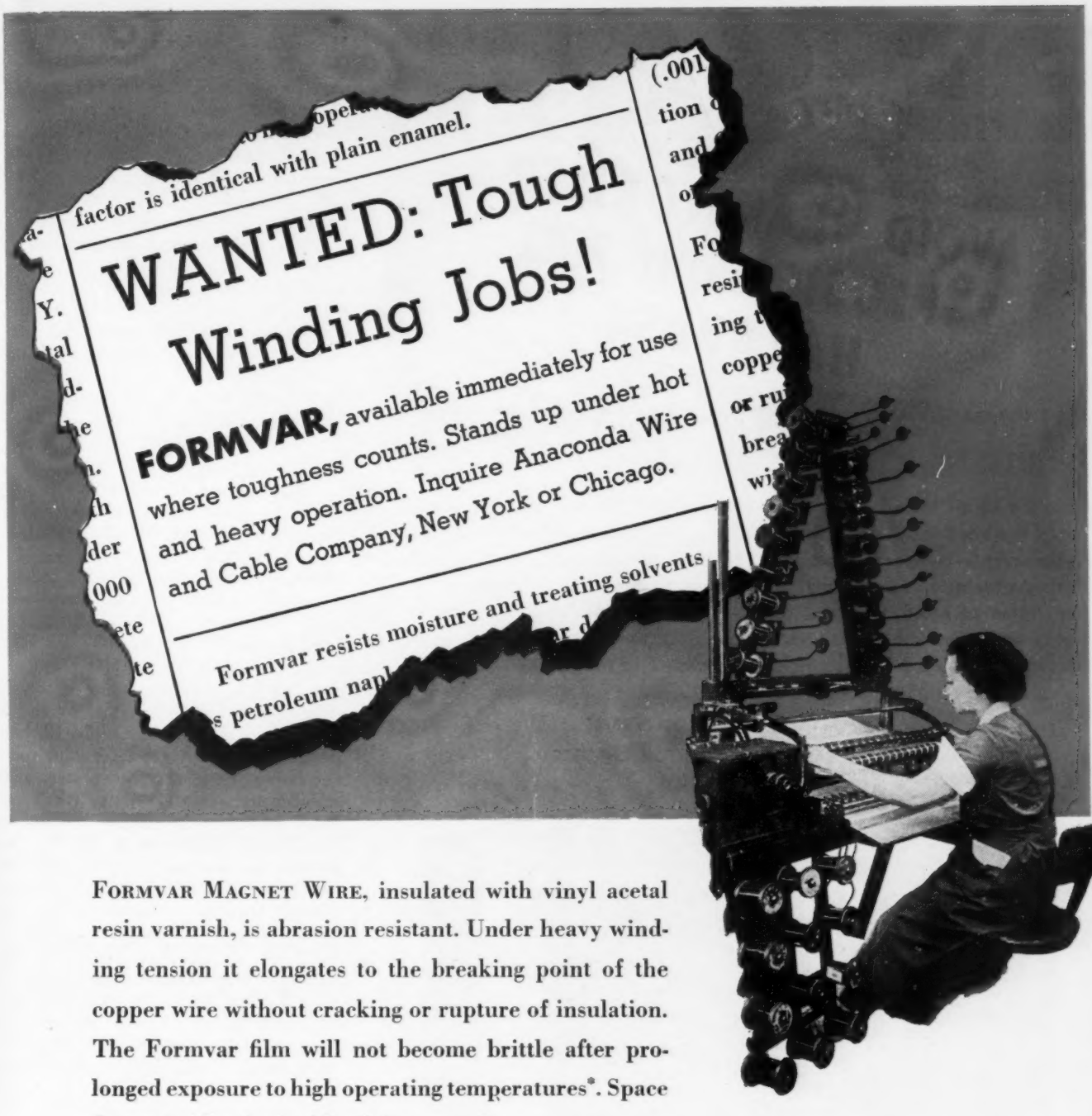
NEW DESIGNS in the New Horizon and Offices models of fluorescent lighting fixtures have been announced by Leader Electric Co, 3500 North Kedzie Av, Chicago 18, Ill.

Translucent tubular plastic is being used for side panels. Plastic is used also for louvers, said to be destaticized. Slimline tubes are another feature of the first fixture. The Offices model uses four 40-w instant-start tubes.

## MORE NEW PRODUCTS about which you should know

Aero-Motive Mfg Co, Kalamazoo, Mich., has "self-wind" electric cord **reels** having swivel action and containing 25 and 45-ft. extensions with plug . . . Jefferson Electric Co, Bellwood, Ill, produces instant starting **ballasts** for long slim fluorescent lamps—single 42T6 and 72T8 lamps, 100 ma and two 96T8 lamps, 100 and 200 ma . . . Robinson-Black Corp has a universal **meter board** made of steel frame for meter socket and panelboard, for switch and control equipment, and for gang type installations.

General Electric Co, Bridgeport 2, Conn. is producing a built-in **wall heater** with nichrome wire elements, rated 132 w, 115 v, to deliver 4507 Btu per hr . . . Cannon Electric Development Co, Los Angeles 31, Calif. has utility colored **pilot lights** ranging from 8-prism plastic lens to 4 separate lens or more, mounted on a plate 4½ in. wide, lighted by No. 93S8 single-contact, 12-v,


factor is identical with plain enamel.
WANTED: Tough Winding Jobs!
FORMVAR, available immediately for use where toughness counts. Stands up under hot and heavy operation. Inquire Anaconda Wire and Cable Company, New York or Chicago.
Formvar resists moisture and treating solvents

FORMVAR MAGNET WIRE, insulated with vinyl acetal resin varnish, is abrasion resistant. Under heavy winding tension it elongates to the breaking point of the copper wire without cracking or rupture of insulation. The Formvar film will not become brittle after prolonged exposure to high operating temperatures*. Space factor is identical with plain enamel.

Formvar resists moisture and treating solvents such as petroleum naphtha and coal tar derivatives. In dielectric strength, it withstands 1000 volts per mil. (.001″) of insulation. For complete detailed information on magnet wire and coils, write Anaconda Wire and Cable Company, 25 Broadway, New York 4, N. Y. or 20 N. Wacker Drive, Chicago 6, Illinois. 49471

**Based on AIEE temperature rating this is a class A material capable of withstanding a "Hottest-spot" temperature of 105° C which is a rise of 65° C over an ambient of 40° C.*

ANACONDA

LOOK TO *Anaconda* FOR ENGINEERED MAGNET WIRE AND COILS

# BE SAFE

## AVOID TRANSFORMER EXPLOSIONS or FIRE HAZARDS

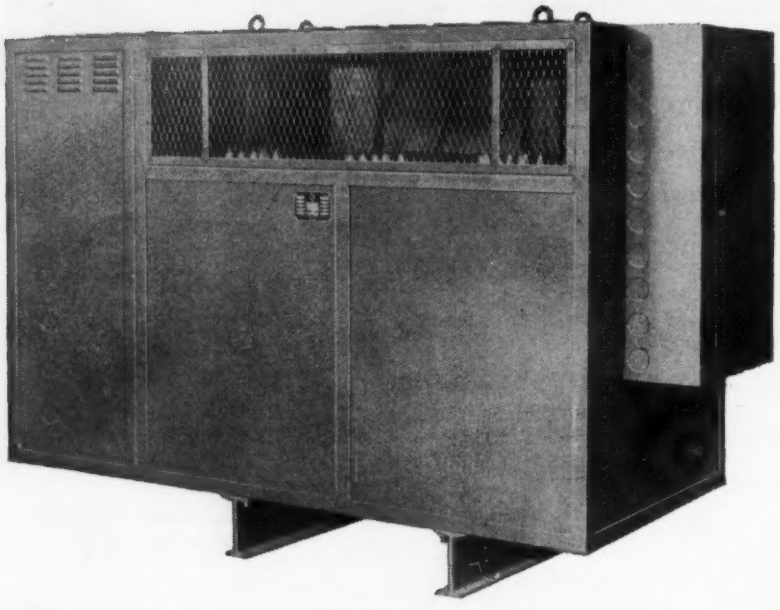
## MARCUS AIR-COOLED TRANSFORMERS

**There's no oil to burn or explode—no messy or toxic liquids—no need of a fireproof vault. In addition, Marcus Air-Cooled Transformers are economical—compact—efficient. They require only negligible attention or maintenance. Electrically, you can be assured of cool, continuous operation at rated capacity. Heatproof Class B (glass, mica, asbestos etc.) insulation withstands severest operating conditions.**
**Marcus Air-Cooled Transformers are available in sizes up to 1000 KVA, single or three phase in voltages up to 13,200.**

***IMPORTANT—GOOD DELIVERIES**

**FIRM PRICES—NO ESCALATOR CLAUSES**

***Write for more details***



***300 KVA TRANSFORMER***

**Primary 4160 volts, 60 cycles, 3 phase; Secondary 480 volts; complete with primary and secondary switches.**

## PIONEERS IN THE FIELD OF AIR-COOLED TRANSFORMERS

## MARCUS TRANSFORMER CO., INC.

**30 Montgomery Street, Hillside 5, New Jersey**


15-cp lamps or No. 6S6 screw base 115-v candelabra lamps. . . . Hilliard Corp, Elmira, N. Y., introduces an **oil purifier** with secondary filter press and automatic filling device for re-refining lubricating oil, capacities 6 to 60 gal.

Alabax Division, Pass & Seymour Inc, Syracuse, N. Y., is producing vapor-proof porcelain **lighting fixtures** with crystal rough inside glass for lamps up to 100 w, and with opal glass for lamps up to 75 w . . . United States Rubber Co, Rockefeller Center, New York City, has developed for Laytex wire a **wax coating** to produce a slippery finish and to make the wire slide with one-half to one-third the former amount of pulling . . . Gleason-Avery Inc, Auburn, N. Y. announces B-30 series of small synchronous **motors** with a gear train for 400 to 1 rpm on the final shaft.

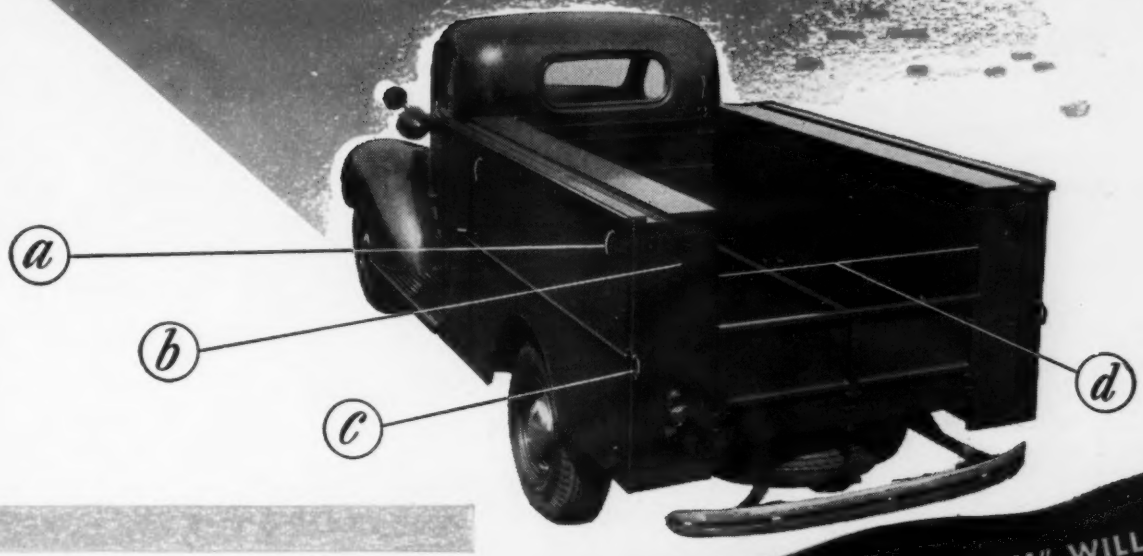
Gulf Oil Corp, Pittsburgh, Pa. announces a flushing **oil** specifically engineered for cleaning the oil-circulating systems of steam turbines . . . Fresh'nd-Aire Co, Chicago, Ill, offers an industrial type, pedestal-mounted **circulator** rated 10,000 cfm at 4 ft, driven by 1/6-hp capacitor motor, 1050 and 730 rpm . . . Fisher-Armour Mfg Co, Chicago 13, Ill, produces a line of EMT thin wall conduit **fittings** with taper fit.

Sola Electric Co, Chicago 50, Ill, has designed a Type CVM-1 constant voltage **ballast** transformer to protect and stabilize the operation of the GE Type UA-4 mercury vapor lamp . . . Radar Rat Traps, Rochester 6, N. Y., developed an electronically operated **rat trap** reported to capture, kill electrically without burning or singeing, eject the body and open doors again . . . Amplifier Corp of America, New York 13, N. Y. is manufacturing a Model SP850 self-contained magnetic **tape** recorded for three tape speeds, with erase oscillator, playback amplifier and speaker.

Cordomatic Division, Vacuum Cleaner Corp of America, Philadelphia, Pa., announces a Trouble-Lite **cord reel** available for vertical, wall or surface mounting and with 20, 25, 40 or 50-ft cord lengths . . . Rotol Chemical Co, Elmhurst, L. I., introduces Rotol, a non-flammable **cleaning liquid,** electrical contacts, slip rings and commutators . . . Pines Engineering Co, Aurora, Ill, offers a semi-automatic **deburring machine** for end finishing tubes up to 2 in. diameter.

Aircraft-Marine Products, Inc, Harrisburg, Pa, has the Shearite, a **cutting tool** in plier shape to cut machine screws (10-32, 8-32, 6-32 and 4-40) also to strip and cut wire . . . Trico Fuse Mfg Co, Milwaukee, Wis, offers a gravity-feed **oiler** for accurate rate of feed and filtered oil to solid bearings . . . Alpha Metals Inc, Brooklyn 1, N. Y. developed Tri-core **solder** having three independently fitted cores of rosin flux.

# "4460"—AMERICAN'S LIGHT UTILITY BODY




## MANY CONVENIENCE FEATURES . . .

*a.* Spacious compartments to carry tools and supplies.

*b.* Waterproof doors.

*c.* Universal lock—to lock all side compartments.

*d.* Ample width for carrying supplies . . . adaptable for mounting aerial revolving ladders for use up to 30' height.

## HOW TO ORDER INFORMATION . . .

**3 Lengths**—75"—90"—104" for use on 1/2, 3/4, 1, and 1- 1/2 ton chassis.

**2 Body Styles**—Open and closed.

U-Type—with tarp cover, drop step and tail gate.

L-Type—Rigid or sliding roof, with or without full length doors at the rear—with or without drop step tail gate.

## THIS "ROLLING STOREROOM" WILL SAVE YOU TIME AND MONEY!

***Cost per call shrinks*** when you equip service and trouble men's vehicles with American Light Utility Bodies, Model 4460. Service "outs" are shortened when a complete complement of stock and tools are on the truck for every call. ***Have your men prepared for on-the-spot emergencies*** . . . ready to make many calls without frequent return trips to the central storeroom.

The American "4460", a long-time favorite with utilities has flexibility for specific requirements. It is available with or without side trays or partitions. ***Write for details.***

•

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**OFFICES** 350 MADISON AVE., NEW YORK 17, N. Y. INSURANCE EXCHANGE BLDG., DES MOINES 9, IOWA

## Wiring Analyzer

BY VIRTUE of its circuit, an analyzer has been developed to simulate load conditions and to detect dangerous connections in wiring. The instrument is being marketed by Leco Engineering Co, Lincoln, Neb.

Consisting of two units, one is a Powerizer source with six No. 6 dry cells, which attaches to the entrance panel to supply simulated load to the circuits. Other unit is a meter with four separate scales for circuit identification, insulation resistance, ground resistance and a-c volts. A range-selector knob is turned for the scale desired. A polarized cable connects meter to outlet for circuit analysis.

•

## Spot-Beam Projectors

A NEW DEVELOPMENT is an incandescent spotlight, known as the Dynabeam Klieglights, produced by Kliegel Bros, 321 West 50th St, New York 19, N.Y. At a throw of 100 ft it is said to give an average of 90 ft-c for a spot 6 ft or smaller in diam. or an average of 50 ft-c for a 20-ft spread. With its spread lens in flood position it may cover an area 20x40 ft wide. It is available with different divergence lens to produce any required width of spread.

The portable unit uses standard voltage lamps. Light may be dimmed and provision is made for controlling size and shape of beam.

•

## Semi-Automatic Welder

EQUIPMENT FOR welding with the hidden arc deep flux process employing high current densities is a recent development announced by the Lincoln Electric Co, Cleveland 1, Ohio. It is the Manual Lincolnweld, a portable unit for semi-automatic welding.

Basic element of the unit is a standard 600-amp welder. Mounted on the welder is a compact unit containing the wire reel, automatic feed mechanism, drive motor and voltage controls. A cable to which is attached a cone-shaped welding gun completes the equipment.

The aluminum welding gun holds 3½ lb of flux dispensed by gravity through a nozzle, which is insulated from the rest of the gun, and which introduces the welding current to the ¼-in. diam wire.

The cable is connected to the feed mechanism and provides a flexible carrier for both the wire and the current. The equipment is said to operate with a maximum of 25 ft of cable.

•

## Link Stick

A NEW ROLLER link stick is being manufactured by A. B. Chance Co, Centralia, Mo. When used in conjunction with a rope, the tool can be used (1) to spread energized conductors when a new pole is to be set in place, and (2) to measure clearances of wires above roads, rail crossings and buildings.

Two sizes of sticks are produced. Sufficient space in the hook permits the roller to pass over compression sleeve splices. One stick is reported suitable for a maximum wire size of 605,000 cir mil ACSR and is reported to withstand 1000 lb tension. The other stick can be used on 3/0 ACSR as maximum. Poles are laminated spruce, voltage tested. Fittings are heat treated aluminum alloy.

•

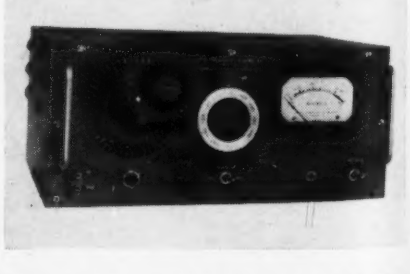
## Carrier Voltmeter

A CARRIER FREQUENCY voltmeter has been developed primarily for making voltage measurements on power lines telephone lines or cables, in the carrier frequency region. The instrument is manufactured by Sierra Electronic Corp, San Carlos, Calif.

Model 101 is actually a radio receiver with a tuning range 20 to 500 kc. The carrier frequency voltage range is 77 microvolts to 77 v, or 80 db below to 40 db above zero level (one milliwatt into 600 ohms).

Indicating meter has a 0-200 microampere range. Scale is calibrated in decibels which indicates ratios of voltages at input terminals to the receiver.

A variable attenuator is connected between the input terminals and the first grid, serving to increase the range of measurable voltages. Tuning dial controls variable frequency.



# *On July 3 Electrical World will carry a study of unique significance to the industry's vast expansion program.*

# "*The* STEAM PLANT COST SURVEY"

## *— the first since 1939*

**With the industry rolling into its greatest expansion program, designs of new steam plant construction must be based on the investment and lessons learned from today's plants. And today's operation sees costs sky-rocketing. How can a kilowatt hour be manufactured cheaper and more reliably? How best can costs be lowered and efficiency improved? Those are vital questions in today's vast expansion of the industry.**

**The industry's executives instructed their engineers to supply data on 113 representative plants, all sizes, all over the country—more than *double* the number in the 1939 survey.**

**That's strong indication of their confidence in Electrical World. It's proof that they'll read your advertising message in this issue—if you tell how your product can contribute to better steam plant performance.**

## *Remember the date: JULY 3*

## *Watch for "THE STEAM PLANT COST SURVEY"*

# NEWS ABOUT PEOPLE

## Stacy Made Vice-President, Conn. Light & Power Co

Robert P. Stacy has been elected vice-president of the Connecticut Light & Power Co, Hartford. He joined the company in 1927 and has served as an engineer in the operating department at

R. P. STACY

Waterbury and in management positions. For a time he was supervisor of customer relations at Hartford and was manager at Rockville-Willimantic. Since 1939 he has been executive assistant at Hartford.

Sherman R. Knapp, assistant to the vice-president in charge of sales, has been appointed assistant to the president of the company. Mr Knapp joined the company in 1928 as a cadet engineer. From 1932 to 1937 he was assistant to the industrial power engineer at Hartford headquarters. He served as New Milford district manager for four years, and was then reassigned to Waterbury.

•

▶ROBERT F. CREUTZ, assistant comptroller of the Commonwealth Edison Co, Chicago, since 1945, has been elected vice-president in charge of industrial relations to succeed Roy A. Dingman, resigned.

▶ GEORGE L. RATTEE has been appointed commercial manager of the Southern Canada Power Co, Ltd, Montreal, succeeding P. T. Davies, vice-president and commercial manager, who has retired. Mr Rattee has been identified with the Southern Canada utility since 1923. After varied experience he entered the commercial department, where he engaged in power sales work and rural electrification. Last year he was made assistant to the commercial manager. Mr Davies spent ten years with Montreal Power before joining Southern Canada Power in its early stages of development. He plans to reside in California.

•

## Acker Elected President, Edison Electric Institute

*(See Front Cover)*

Ernest R. Acker, president and general manager of the Central Hudson Gas & Electric Corp, Poughkeepsie, N. Y., was elected president of the Edison Electric Institute at the annual convention held this week in Atlantic City.

For a number of years Mr Acker has been prominently associated with the utility industry in the Empire State. He became identified with Central Hudson in 1919 as a cadet engineer in the general operating department. He was made general superintendent of the Kingston Gas & Electric Co—at that time a unit of the Central Hudson system—in 1921 and held that position until he was appointed general commercial manager of the Central Hudson in 1925. Seven years later Mr Acker was elected president and general manager of the company, succeeding the late Thaddeus R. Beal.

Mr Acker is a member of the operating committee of the Edison Electric Institute. In 1936 he served as president of the Empire State Gas and Electric Association. He was doubly honored by the gas industry at the 1943 annual meeting of the American Gas Association, when he was elected president of the association and received the Charles A. Munroe Award for having made the most outstanding recent contribution toward the advancement of the industry.

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▶ C. D. MURDOCK, overhead department, Kansas City (Mo.) Power & Light Co, has been named safety director of the company. Mr Murdock has been identified with the company since 1920.

## Herbert Briggs, Jr., Elected President of P.U.A.A.

Herbert Briggs, Jr, advertising manager of the Philadelphia Co and subsidiary companies, and for the trustees,

H. BRIGGS, JR.

Pittsburgh Railways System, was elected president of the Public Utilities Advertising Association at the convention held last week in Cleveland.

A graduate of Rose Polytechnic Institute, Mr Briggs spent one year with the Duquesne Light Co in 1921 as a test engineer, power stations department. He transferred to the advertising department in 1925 and ten years later was appointed assistant advertising manager. It was in 1945 that he was appointed advertising manager.

•

▶ JOHN E. SHEEHAN, of Atlanta, Ga., has been appointed principal engineer and assistant general manager of the Glendale (Calif.) Public Service Department. Mr. Sheehan is a graduate of the University of Colorado and Stanford University, holding degrees in electrical engineering and law.

▶ PHILIP TORCHIO, JR, has been appointed assistant to the operating vice-president of the American Gas & Electric Service Corp, New York. Mr Torchio was previously associated with Consolidated Edison Co of New York, Inc, serving in various capacities in the generating, distribution, sales, purchasing, and engineering departments over a period of 16 years. During the war he

# Steel Hard to Get?

## *Demand Still Exceeds Supply But . . .*

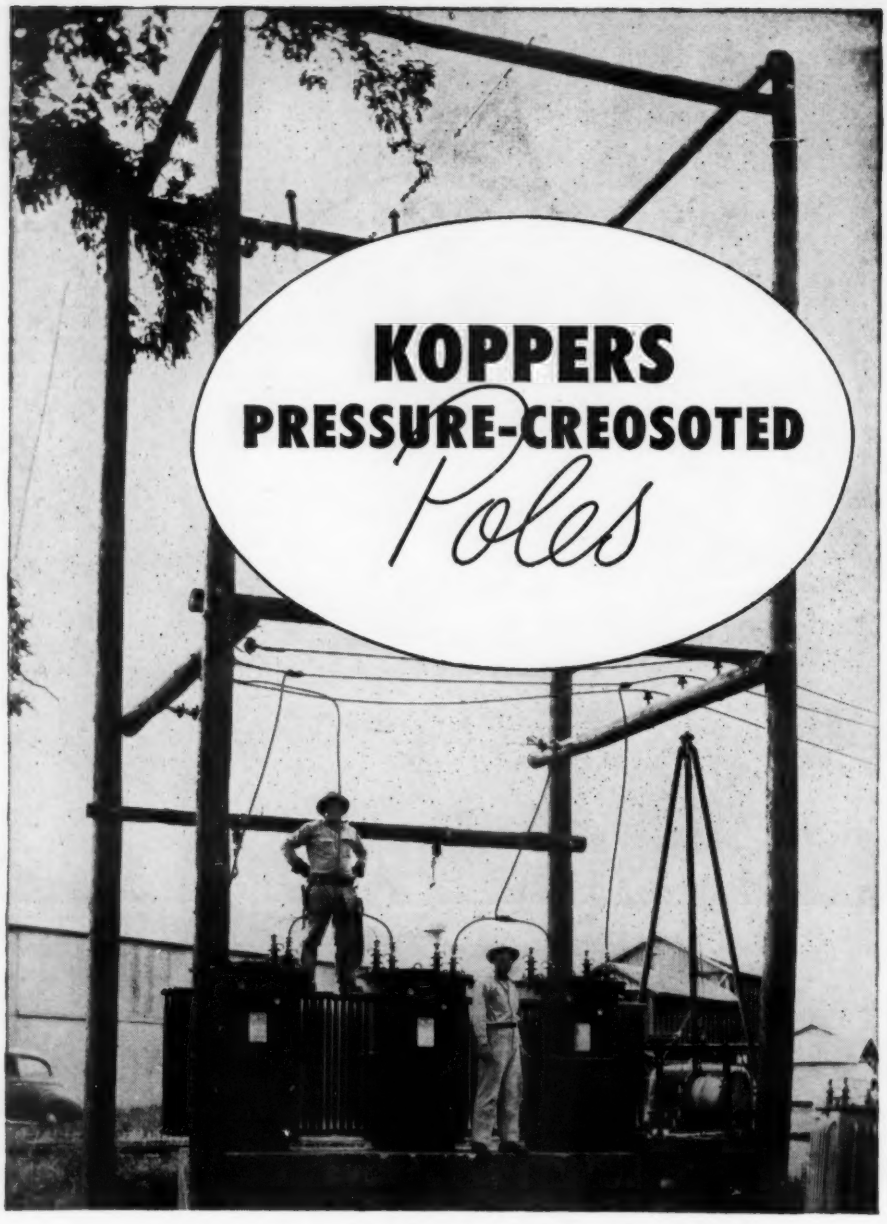
. . . this is a typical view of night loading operations at a Ryerson steel-service plant. The steels specified on several orders are on their way to a loading platform for delivery the following morning. Possibly none of these orders are completely filled—however, the fact remains, we are doing our very best to serve a large group of steel users.

Unfortunately, it often seems that the particular steel *you* want is never on hand, and it is true that we are always short of some kinds and sizes. But our stocks turn over fast. A size that is out today may be in tomorrow. And in spite of current conditions, we still believe the over-all stocks at our thirteen plants are the nation's largest.

Carbon and alloy steels, hot rolled or cold finished, and stainless steel in practically every analysis and finish are in stock, ready for your call. So do not hesitate to get in touch with us —on any requirement. You'll find that every Ryerson steel man will do everything possible to help you get the steel you need, when you need it.

Joseph T. Ryerson & Son, Inc. Plants at: New York, Boston, Philadelphia, Detroit, Cincinnati, Cleveland, Pittsburgh, Buffalo, Chicago, Milwaukee, St. Louis, Los Angeles, San Francisco.

# RYERSON STEEL




# PAST PERFORMANCE

*is* YOUR *best yardstick*

There's no margin for error or experiment in Utility pole installations. Dependability is *always* a "must."

Koppers Pressure-creosoted Poles, backed by long experience in the manufacture and processing of forest products . . . by constant and intelligent research . . . and by a record for long life and low costs, have a history that certifies their performance.

Prompt deliveries are assured from conveniently located treating plants. Ample facilities permit stocking of all needed quantities and sizes for contract treatment or out-of-stock shipments.

K
KOPPERS

PRESSURE-TREATED WOOD

KOPPERS COMPANY, INC.

PITTSBURGH 19, PA.

served with the Navy Amphibious forces and was engaged in European and Pacific Theatres of Operation.

•

## Pennsylvania Water Elects Bortner Vice-President

R. L. Bortner, formerly assistant secretary of the Pennsylvania Water & Power Co, Baltimore, has been elected

R. L. BORTNER

vice-president of the company in charge of property and public relations.

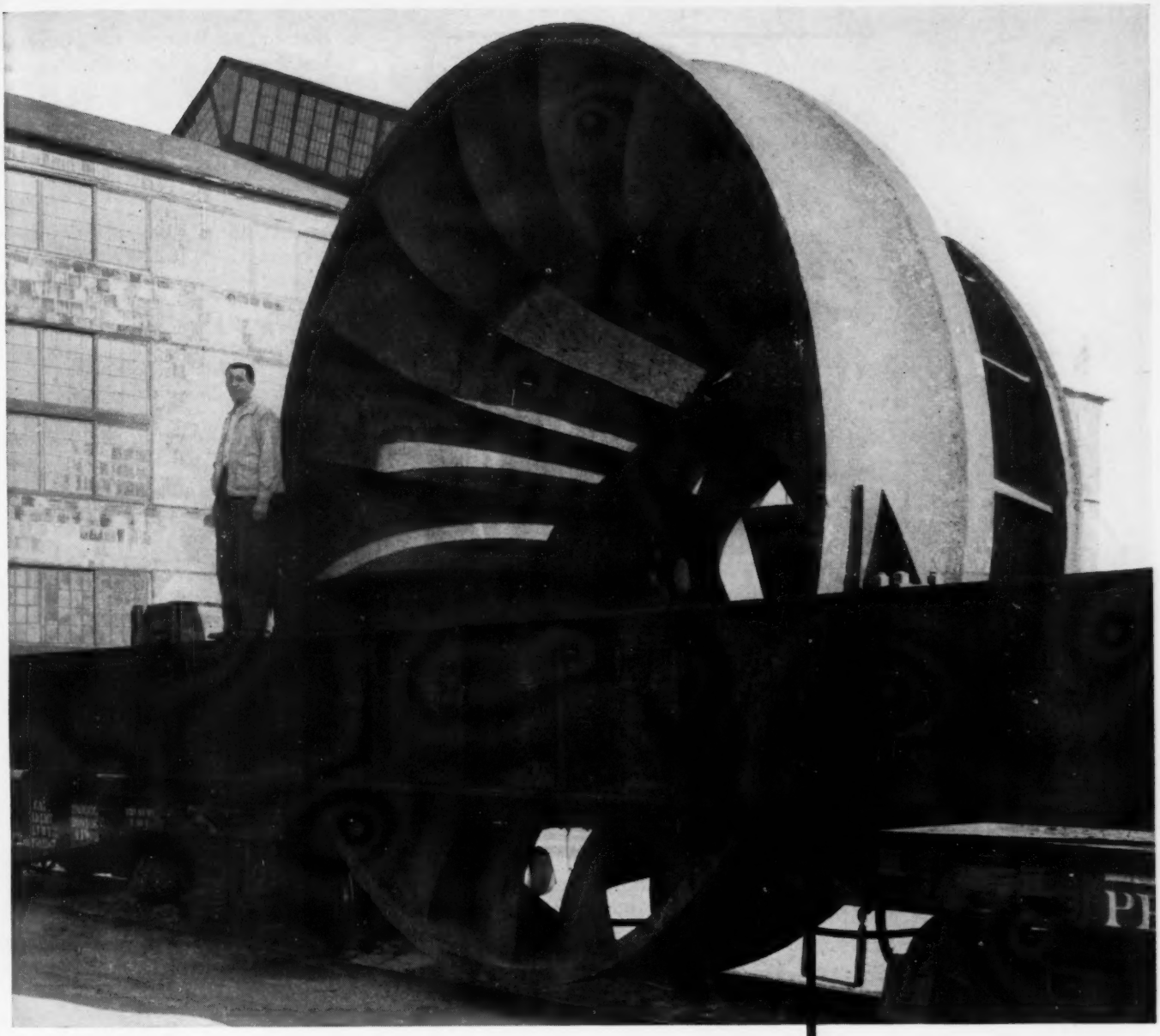
Entering the employ of the company in 1920, Mr Bortner was made right-of-way agent four years later and in this capacity was actively engaged in the purchase of land and land rights required for the Safe Harbor hydroelectric development and for the system transmission lines.

He was placed in charge of all real estate matters in 1927 with the title of right-of-way engineer and in 1944 was elected assistant secretary of the company.

•

▶ CHARLES L. SMITH, formerly chief electrical inspector of Detroit, has been appointed electrical field engineer of the National Fire Protection Association and secretary of the International Association of Electrical Inspectors, with offices in Chicago. After a long and varied career in the electrical business, Mr Smith became chief electrical inspector of Detroit in 1947. He attended Case Institute of Technology and taught basic electricity and the National Electrical Code at the Michigan Technical Institute.

▶ JAMES A. BRIGHT, operating engineer, South Carolina Public Service Authority (Santee-Cooper), has resigned. Mr Bright has been appointed chief engineer for the Pittsburgh Metallurgical Co, Niagara Falls, N. Y., and Charleston, S. C. HERBERT L. STOKES, Mr Bright's assistant, has been promoted



# *They can't come too big for Baldwin*

Among the largest one-piece runners so far produced in the United States is this giant for one of the five 62,200-hp. hydraulic turbines now being built by Baldwin for Davis Dam. It is 17 feet in diameter and weighs approximately 143,000 pounds.

In its Eddystone and Pelton plants, Baldwin is equipped to build turbines of all types, from the smallest to the largest, to suit all head conditions. Model tests in modern hydraulic laboratories and half a century of engineering experience insure the operating smoothness and efficiency of every Baldwin turbine.

Write for Bulletin 252.

**Offices: Birmingham, Boston, Chicago, Cleveland, Houston, New York, Philadelphia, Pittsburgh, San Francisco, Seattle, St. Louis, Washington. In Canada: Baldwin Locomotive Works of Canada, Ltd., Toronto, Ontario.**

**BALDWIN**

**HYDRAULIC TURBINES**

**The Baldwin Locomotive Works**
**Philadelphia 42, Pa.**

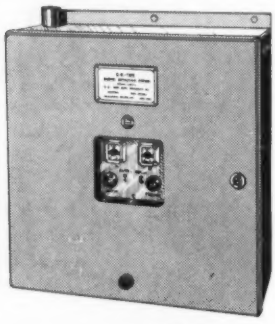
**The Pelton Water Wheel Company**
**2929 Nineteenth St., San Francisco 10, Calif.**

Teach fire prevention of course ...but be sure you have modern fire protection by

All the training, all the good housekeeping requirements are necessary. Even then . . . a stray spark or short circuit just seems to happen . . . a fire starts. That's when you need modern, quick-acting C-O-TWO fire protection. C-O-TWO is dry, clean carbon dioxide gas . . . snuffs out the fire in seconds, then disappears without a trace. It is non-contaminating, non-damaging, non-conducting and non-corrosive.

There are areas in your plant that particularly need C-O-TWO fire protection: spray booths, dip tanks, solvent baths, electrical equipment enclosures, lift trucks, pump rooms, anywhere there's danger of flammable liquid or electrical fires. For complete fire protection in enclosed areas such as record vaults and store rooms, install the new C-O-TWO Combination Smoke Detecting and Fire Extinguishing System. This new system is a 24 hour a day automatic watchman.

Let an expert C-O-TWO Fire Protection Engineer advise you on your fire protection needs now, before fire strikes. Just clip this advertisement to your letterhead or calling card and mail for complete information about modern C-O-TWO Fire Protection Equipment. Remember fire doesn't wait . . . act now!



C-O-TWO
INDUSTRIAL SMOKE DETECTING
CABINET

TRADE MARK C-O-TWO REG. U.S. PAT. OFF.

C-O-TWO FIRE EQUIPMENT COMPANY
NEWARK 1 • NEW JERSEY
Sales and Service in the Principal Cities of United States and Canada
AFFILIATED WITH PYRENE MANUFACTURING COMPANY

to operating engineer for the Authority and will assume most of Mr. Bright's duties.

•

## J. L. Kilpatrick Appointed Vice-President of Silvray

Appointment of John L. Kilpatrick as vice-president of Silvray Lighting, Inc, New York, has recently been announced.

Mr Kilpatrick joined the Silvray staff more than a year ago as manager of lighting development. He has had nearly 25 years' experience in the field of illumination, approximately half of this time being spent with the Westinghouse Electric Corp in both lamp and lighting divisions.

During the recent war, he was selected by the Government to serve as a member of the technical intelligence group sent to investigate enemy developments in various technical fields. He has been active in various organizations related to the lighting business, having served on numerous committees of the U. S. National Committee of the International Commission on Illumination, the Illuminating Engineering Society, the Better Light-Better Sight Bureau and the Edison Electric Institute.

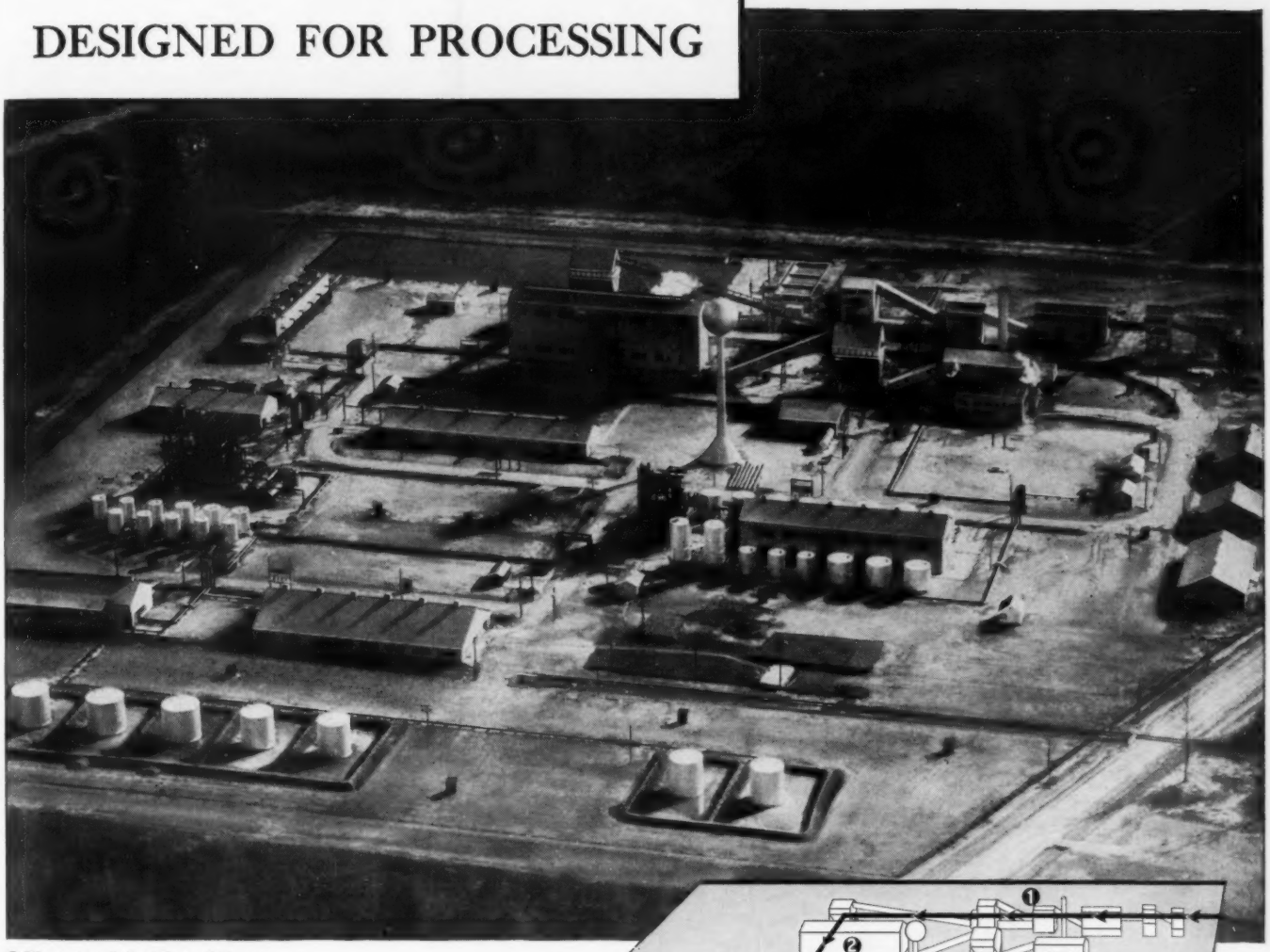
Frank A. Eustace has been appointed to head advertising and sales promotional activities of the company. Mr Eustace was formerly in charge of advertising and sales promotion for P. & F. Corbin, division of the American Hardware Corp at New Britain, Conn.

•

▶ R. Frank Steele has been elected president and treasurer of the Adams (N. Y.) Electric Light Co, succeeding in these capacities his father, the late Mark B. Steele. Prior to his connection with the company which he now heads, Mr Steele served for many years on various hydroelectric projects including Chute-a-Caron, Kenogami, Province of Quebec, Canada; Madden Dam, Canal Zone, and Bonneville.

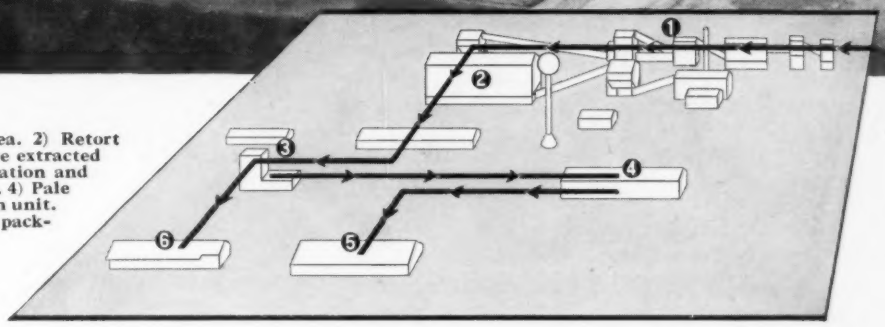
▶ Fred D. Gordon has retired as vice-president of the Central Maine Power Co, but will continue as a director. He joined the then Lewiston-Auburn (Me.) Electric Co in 1896. Later he became manager of the Androscoggin Electric Co. In 1920 Mr. Gordon became manager of the Cumberland County Power & Light Co, Portland. This is now the southern division of Central Maine. He was elected vice-president of Central Maine Power in 1928, and is widely known in the East as a public utility executive. Mr Gordon is a past-president of the New England section of the former N. E. L. A. He is one of only

# DESIGNED FOR PROCESSING



© Photograph by Elwood Payne

1) Wood preparation and grinding area. 2) Retort building where terpenes and rosins are extracted by solvent. 3) Finishing unit for distillation and separation of solvent, terpenes and rosins. 4) Pale rosin decolorization and solution evaporation unit. 5) Rosin packaging building. 6) Oil loading and packaging building.




**The Naval Stores Extraction Plant for Newport Industries, Inc., at Oakdale, Louisiana, provides for complete processing of pine stumps, from wood preparation to decolorizing rosin and packaging rosins and terpenes for shipment. Newly developed applications of continuous flow processing, and efficient fractionation result in products of the highest obtainable quality. This plant, with related facilities, was designed and constructed by Stone & Webster Engineering Corporation in collaboration with the engineers of Newport Industries, Inc.**

## STONE & WEBSTER ENGINEERING CORPORATION

A SUBSIDIARY OF STONE & WEBSTER, INC.

# MOSINEE

*"More than Paper"*

In the field of electronics and the electrical goods industry, MOSINEE stands for paper-base processing materials with scientifically controlled chemical and physical properties, high quality standards and dependable uniformity... with good dielectric strength, high tensile or tear strength; proper softness or stiffness; creped with controlled stretch or flexibility; specified pH for maximum-minimum acidity or alkalinity; accurate caliper, density, liquid repellency or absorbency . . . or other technical characteristics vital to your quality standards and production requirements.

**MOSINEE PAPER MILLS COMPANY • MOSINEE, WIS.**

*"Essential Paper Manufacturers"*


five men who have served Central Maine Power and its predecessors for over 50 years.

•

## New Appointments Made by General Electric Co

Engineering and sales appointments have recently been announced by the General Electric Co.

H. M. JALONACK has been appointed manager of sales planning in the company's transformer and allied product divisions. He will supervise the developing of sales programs, selecting and training of new sales personnel, and promoting and coordinating industry standardization. During his 31 years with GE, Mr Jalonack has served as district transformer specialist, assistant sales manager and later sales manager of the distribution transformer and feeder regulator section, and assistant to the manager of the transformer division.

J. M. KUNKEL has been made production manager of the motor manufacturing division, Lynn, Mass. He joined the company in 1927.

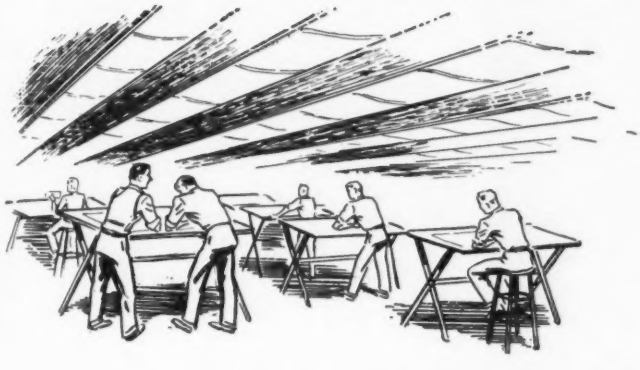
R. CUTTS, JR, has been appointed assistant manager of sales, meter and instrument divisions, West Lynn, Mass. R. H. MITCHELL has been appointed administrative assistant to E. H. Howell, manager of sales. Mr Cutts will also be manager of meter product sales, and E. J. BOLAND manager of instrument product sales. Mr Mitchell will also be manager of a newly established marketing service division, including research and sales promotion. A. L. CARVILL becomes sales manager, meter and instrument transformer sales division. J. M. WHITTENTON is now sales manager of the electric instrument sales division. E. R. HARRISON has been appointed sales manager of the time switch sales division, and A. G. WOODSIDE sales manager of the aircraft instrument sales division.

Three major appointments in the control divisions of the apparatus department have been announced. M. H. BLESH has been named manager of manufacturing; C. B. BRADISH, manager of engineering and E. A. GREEN, manager of sales.

Three recent appointments in the sales group of the specialty transformer and ballast divisions, apparatus department, have been made. P. M. STAEHLE, who has been associated with GE since 1912, will head the new sales organization. C. STONEHILL, formerly manager of sales of the lighting components section, is the new manager of the ballast sales division and H. K. PRITCHARD, formerly manager of sales of general-

# FLUR-O-GUIDE LENS PANELS

## *By Corning for Controlled Fluorescent Lighting*



Here is another product of Corning research which provides maximum light distribution on working areas, reduces glare in the eye-level zone, and provides truly attractive illumination. It is the new Corning Curved Lens Panel for *controlled* fluorescent lighting. Attractive in design and made of clear crystal glass, Corning Curved Lens Panels enable you to develop pleasing lighting systems with a high degree of design flexibility.

### Greater Working Comfort Through Controlled Fluorescent Lighting

Corning Curved Lens Panels focus most of the light straight down in the 0° to 45° zone for greater working comfort. (See distribution curves, opposite page.)

Prisms in the side area deflect light from the glare zone between 45° and 90°, and direct it upward, where it is useful in illuminating the ceiling. A new effect in fluorescent lighting design, this ceiling light minimizes light and dark contrasts and lends a pleasing appearance to the complete installation.

### Design Flexibility, Easy Installation

1. The only curved lens panels which are 11″ wide and are well adapted for installation in standard 12″ ceiling tile construction.
2. These are the only lens panels available in two styles: No. 540022, both ends open; No. 540023, one end closed. Having two styles provides you with opportunities to use these new FLUR-O-GUIDE Lens Panels either in continuous row or in separate fixtures. No cap is required over the glass end, thus permitting substantially dust free installations.
3. The lens panels are made of clear glass especially for illumination, providing greater transmission and better color quality.
4. Tubes mount lower in reflector permitting shallower fixtures and trimmer appearance.
5. Installations can be made quickly and easily.

### Corning Lightingware Answers *All* Commercial Lighting Requirements

Corning Glass Works is the only company which offers you lighting glassware that will meet any commercial requirement. ALBA-LITE and MONA-LITE, Corning's diffusing lightingware, are designed for use with fluorescent light sources. MONA-LITE may also be used with incandescent light sources. FLUR-O-Guide Lens Panels and Lenslites, Corning's prismatic lightingware, are also adapted for fluorescent or incandescent light sources. Corning lighting engineers are available for consultation on any requirements you may have. Call your nearest Corning office.

CORNING means research in GLASS

PYREX T.M. REG. U.S. PAT. OFF.

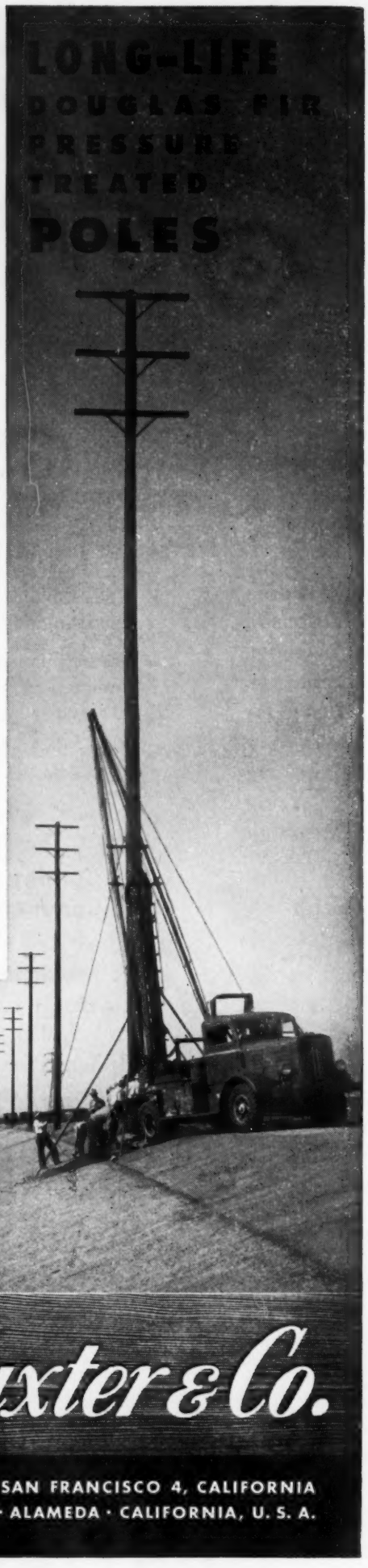
**CORNING GLASS WORKS • CORNING, N.Y.**

*SALES OFFICES: NEW YORK • CHICAGO • SAN FRANCISCO*

**LIGHTINGWARE**

GAUGE GLASSES • GLASS PIPE • LABORATORY GLASSWARE • GLASS COMPONENTS

# BAXCO




In transmission lines–distribution, lighting or telephone systems–wherever dependable service is of prime importance you can count on Baxco Long-Life Poles to do the job.

Baxco Long-Life Poles are strong, straight, machine shaved, Coast-type Douglas Fir pressure treated with creosote and pentachlorphenol to resist rot, termites and deterioration.

You'll be proud of these poles in your line and more than satisfied with their long maintenance-free service. Write or wire us your inquiries.

*Also Produced by*
J. H. Baxter & Co. of Oregon
*an associated company*
Plant and Yard–Eugene, Oregon

*J. H. Baxter & Co.*

333 MONTGOMERY STREET · SAN FRANCISCO 4, CALIFORNIA
LOS ANGELES · LONG BEACH · ALAMEDA · CALIFORNIA, U. S. A.


purpose components division, is manager of the specially transformer sales division.

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▶ MELVILLE EASTHAM, chief engineer and founder of the General Radio Co, Cambridge, Mass., has been granted the New England Award. Sponsored by the Engineering Societies of New England, the award is given annually for outstanding service to the profession. Mr Eastham established the company in 1915. His career has been marked by pioneer developments in radio, electronics and navigation, largely based on the design and production of precision instruments. He was in charge of "Loran" development at the Radiation Laboratory of the Massachusetts Institute of Technology during World War II. He holds a Certificate of Commendation from the Bureau of Ships, U. S. Navy.

▶ CHARLES A. GLEASON has retired from the Scoville Mfg Co, Waterbury, Conn., which he joined in 1920. He entered the company to undertake sales promotion work on condenser tubes. He played a large part in placing the marketing of such tubes on a sound engineering basis. For the past 12 years Mr Gleason held the position of engineer in charge of technical condenser tube service. His duties have been assumed by MAURICE C. PRESLEY. Mr Presley is a graduate of Webb Institute of Naval Architecture. He is a former employee of the Consolidated Edison Co of New York, Inc. During the recent war years, Mr Presley was engaged on condenser and heat exchanger work in the U. S. Navy Department's Bureau of Ships.

▶ GEORGE R. SOMMERS, Pacific Coast manager of lighting products for Sylvania Electric Products, Inc, has been appointed director of sales for all product divisions of the company in that area. He will continue his headquarters at San Francisco. Sommers, a graduate of Northeastern University, joined Sylvania in 1940 as a lighting fixture specialist. He held his last position for three years. While in Washington, he originated the Sylvania Fluorescent Maintenance Plan which has been adopted nationally by the company.

▶ EDWARD G. F. ARNOTT has been appointed assistant director of research for the Westinghouse Lamp Division, Bloomfield, N. J. Mr Arnott, an instructor in physics at Princeton University from 1930 to 1932, joined the company at the Lamp Division in 1933 as a factory engineer in electronic tube manufacturing. Two years later he became an electronics engineer and in

# Which Properties Do You Need Most in Electrical Contacts?

IN theory, the perfect contact material should combine non-sticking properties, low contact resistance, high thermal and electrical conductivity and resistance to electrical erosion with high strength and hardness. In actual practice (because operating conditions differ widely) only two or more of these properties usually predominate.

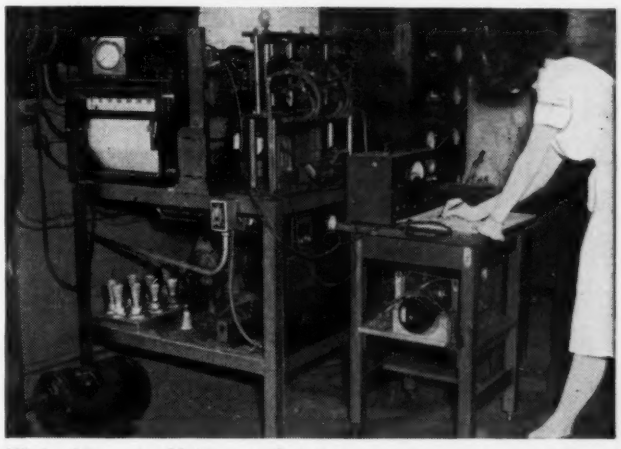
How does Mallory produce materials in which the correct properties for a specific job exist? You can be sure it isn't done by guesswork. Although Mallory has designed more than 5000 different contacts—has had 20 years of experience in metallurgy generally—it believes in rigid control. This control is accomplished by a series of spectrographic, chemical, electrical and microscopic tests such as you see at the right. They reveal the truth about chemical composition, grain structure, physical properties.

MALLORY STANDARDIZED CONTACTS

Yes, you're sure when you order Mallory contacts. Furthermore, you get the benefit of Mallory design experience, its manufacturing facilities for producing every kind of contact including contact assemblies. What's more, Mallory has developed eight basic contact designs that meet thousands of typical applications—save time and money involved in designing "specials." Send for the Mallory Contact Catalog.

*This Mallory spectrograph determines the purity and composition of metals and alloys.*

*Here Mallory learns what happens in the electrical circuit when contacts are opened and closed.*



*With this unit, Mallory technicians measure contact resistance, temperature rise, and rate of wear.*

**IT'S 5000 TO 1 THAT A MALLORY STANDARD CONTACT WILL MEET YOUR "SPECIAL" REQUIREMENTS**

P.R. MALLORY & CO. Inc.

**MALLORY ELECTRICAL CONTACTS & CONTACT ASSEMBLIES**

P. R. MALLORY & CO., Inc., INDIANAPOLIS 6, INDIANA

# installation time: 5 minutes!

## FRANKEL INSULATED GUTTERTAP

**...faster to install!** Because insulated cover clamps on in a second without screws . . . bothersome, costly taping is eliminated. Fastenings of connector and cover are accessible . . . always on the side facing the electrician.

**...easier to install!** Because it's so compact! . . . small enough to solve the tough installation problem of tight working space. It's easier, too, because tap can be taken either from right or left of main cable.

**costs less!** On larger sizes, guttertaps show a saving of up to 33⅓% over split-bolt connectors.

- Available in full range of sizes to fit any combination of wires from 1000 MCM through No. 14.
- All underwriter approved, of course!
- Engineered for quality and dependability — priced for economy.

*Write today for your copy of catalog 4C*

It's easier and faster when you use Frankel Solderless Connectors

*Sold Through Leading Wholesalers Exclusively*

Frankel Solderless Connectors

**FRANKEL CONNECTOR CO.**

**27 Vestry St., New York 13, N. Y.**

42 YEARS OF KNOW-HOW IN SOLDERLESS CONNECTORS


1940 he joined the research staff. A specialist in the study of gas discharges for fluorescent lamps and electronic tubes, Mr Arnott is the author of technical articles and holder of several patents.

▶ B. STANLEY has been appointed general sales manager in charge of all sales for Arco Electronics, Incorporated, New York. Mr Stanley's background includes a war record as officer in the U. S. Marine Corps, attached to the Signal Supply Division.

## OBITUARY

### Samuel P. MacFadden

Samuel P. MacFadden, formerly executive vice-president of the Puget Sound Power & Light Co, Seattle, died on May 22 in that city after a brief illness. He was 53 years old.

Mr MacFadden was a native of Laredo, Tex. He held various executive positions in Texas electric companies before going to Seattle in 1930 as vice-president and director for the Puget Sound Power & Light Co. In 1942 he became executive vice-president for Puget Sound, but poor health forced him to resign his operational duties in 1946 and become consultant for the company. He was a past-president of the Northwest Electric Light and Power Association and a member of the A. I. E. E.

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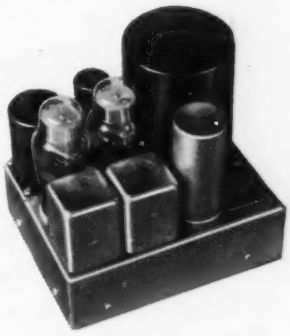
▶ RAY W. GARVIN, publicity and advertising department manager, Monongahela Power Co, Fairmont, W. Va., died suddenly on May 20 in Clarksburg, W. Va., at the age of 52. A former state senator and member of the House of Delegates from Harrison County, Mr Garvin was widely known in political circles and in the newspaper field. He joined the Monongahela Power Co's public relations department in 1927. In connection with his work in this capacity, Mr Garvin was a leader in the formation of the Upper Monongahela Valley Association, the Fairmont Coal Bureau and other public bodies. He was making plans to attend the annual meeting in Cleveland last week of the Public Utilities Advertising Association, of which he was elected secretary at last year's meeting in Detroit. He was a native of Kirksville, Iowa.

▶ STEPHEN W. BORDEN, prominently identified with the electrical industry for a number of years, died of a heart attack on May 13 at his home in Summit, N. J. He was 65 years old. Born in Canning, Nova Scotia, Mr Borden

# EM IS AN IMPORTANT PART of AM FM TV BROADCASTING

STABILINE Automatic Voltage Regulators Type EM (Electromechanical) are the answer to regulation problems in radio and television transmitting stations . . . high frequency relay stations.

The FCC recommends adequate voltage regulation equipment where the power supplied by the utility varies more than 3% from nominal over a 24 hour period. The STABILINE Voltage Regulator Type EM is ideally suited for this regulation task. Some of the outstanding features include . . . zero waveform distortion, complete insensitivity to the magnitude and power factor of the load, no effect on system power factor, high efficiency and no critical adjustments. Its long-term stability for 24 hour line correction means that Type EM requires negligible attention. Under normal conditions, the output voltage need not be adjusted more than once a month.



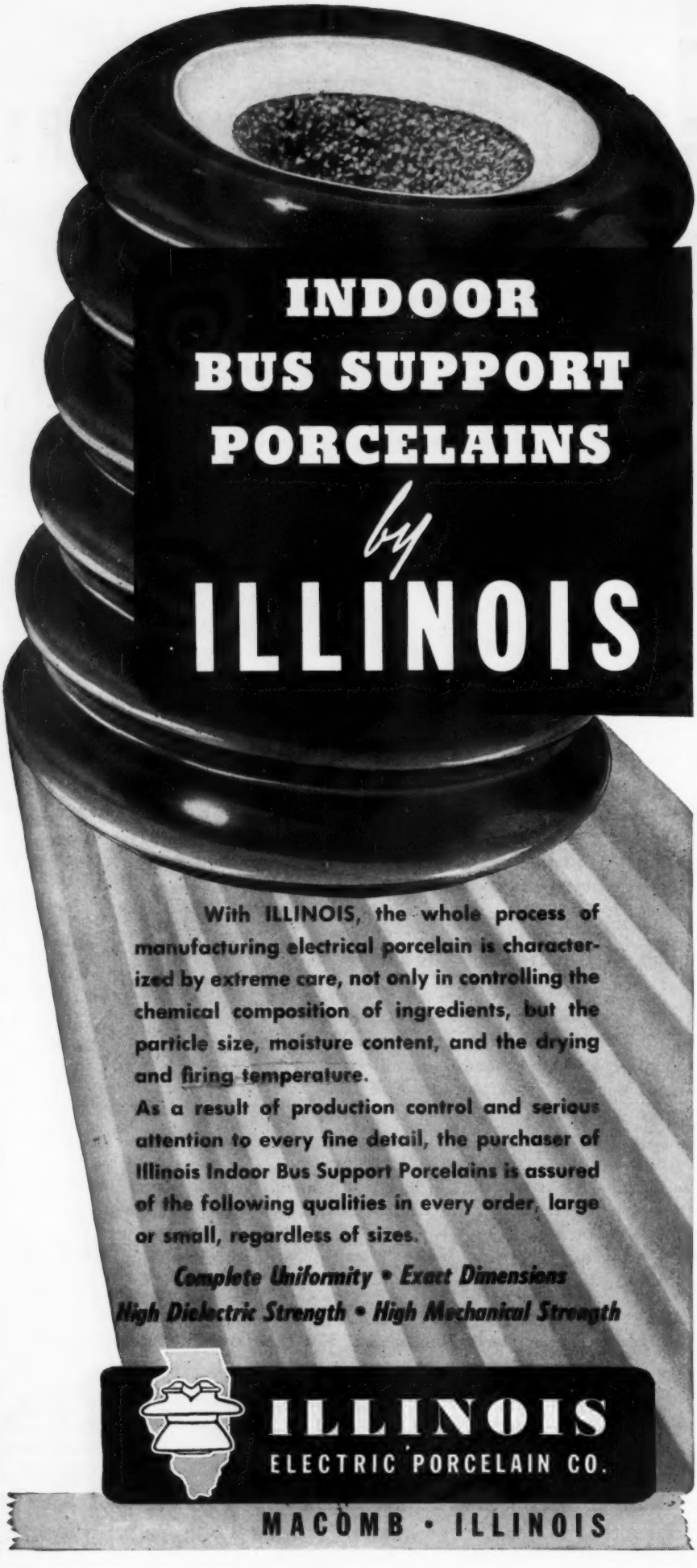
The STABILINE Voltage Regulator Type EM consists of an electronic detector circuit controlling a motor-driven POWERSTAT variable transformer. The moving parts are rugged, quality manufactured components which require a minimum of service and attention. The electronic control circuit itself is plug-in type and incorporates the latest advances in detector circuit design. This plug-in feature, combined with the convenient replacement service agreement made at the time of purchase, eliminates maintenance difficulties. The attractive black wrinkle-finished front panel has a 4 inch output voltmeter and screw driver adjustment controls for sensitivity and output voltage setting. Numerous models are available in ratings from 1 KVA to 100 KVA to meet most requirements. Rely on the experience of the Superior Electric Company's staff of voltage control engineers to assist with your voltage regulation problems.

Request Bulletin #448 for detailed information on the STABILINE Type EM and its application in the broadcast field.

**Write The Superior Electric Co., 506 Meadow St., Bristol, Conn.**

**THE SUPERIOR ELECTRIC CO.**
**BRISTOL, CONNECTICUT**

**Powerstat Variable Transformers • Voltbox A C Power Supply • Stabiline Voltage Regulators.**


INDOOR
BUS SUPPORT
PORCELAINS
by
ILLINOIS
With ILLINOIS, the whole process of manufacturing electrical porcelain is characterized by extreme care, not only in controlling the chemical composition of ingredients, but the particle size, moisture content, and the drying and firing temperature.
As a result of production control and serious attention to every fine detail, the purchaser of Illinois Indoor Bus Support Porcelains is assured of the following qualities in every order, large or small, regardless of sizes.
Complete Uniformity • Exact Dimensions
High Dielectric Strength • High Mechanical Strength
ILLINOIS
ELECTRIC PORCELAIN CO.
MACOMB • ILLINOIS

was educated in Massachusetts and obtained his early experience with the General Electric Co at Lynn, Mass. After seven years with the Tuxedo, N. Y., Electric Co he took over the management of the Bassett properties in Summit, N. J., which included the Commonwealth Water & Light Co, Lakewood and Coast Electric Co and the Point Pleasant Traction Co. In 1923 he negotiated the sale of these properties and established his own business in the conduit ground fitting field under the name of Groundlet Co of Newark, N. J. Disposing of this business in 1927, he formed the Borden Electric Co, Summit, N. J., for the development of his "ground testing" patents. Mr Borden was a member of the American Institute of Electrical Engineers and of other engineering societies. An inventor of some note, he had to his credit more than 25 patents.

▶ THORULF PHILIPSEN, mechanical engineer of the West Penn Power Co, Pittsburgh, died on April 20. Mr Philipsen was born in Denmark and after completing his education at the University of Copenhagen and the Royal School of Engineering, he traveled extensively in Europe working on mechanical installations. Coming to the United States in 1917, he became identified with the Westinghouse Electric Corp. For more than 25 years he had been an engineer for West Penn, planning and supervising many of its outstanding construction jobs.

▶ T. P. JOHNSON, district manager of the Texas Electric Service Co at Sweetwater, Tex., died on May 1 in Fort Worth of a heart attack. Mr Johnson was in Fort Worth attending a sales meeting and the Texas Electric Show. He started working for the company in Fort Worth and later served in Eastland, Eagle Pass and again in Eastland. He went to Sweetwater in 1940.

▶ SIR MURRAY MORRISON, a pioneer in the production of aluminum in Great Britain and in the utilization of water power in the highlands of Scotland, died in London on May 21 at the age of 74. He had been with the British Aluminum Co from its inception until his retirement two years ago as managing director.

▶ HOWARD K. DUTCHER, consulting engineer, who received the Order of the British Empire for his work on a power project in Tasmania, died on May 8. He was 69 years old. A graduate of McGill University, he had taught there, at Toronto University and the University of British Columbia. He was associated with Dutcher, Brockington & Co, engineers.

# I.Q. TEST ON INSULATING OIL PURIFIERS

What would you score?

**Q.** What is the safest way to purify insulating oil?

**A.** By means of centrifugal force.

**Q.** Why is centrifugal force most effective?

**A.** Because the centrifugal Oil Purifier removes the water in a single pass and continuously discharges it to waste. Water once removed cannot recontaminate the oil.

**Q.** What is the function of the blotter press?

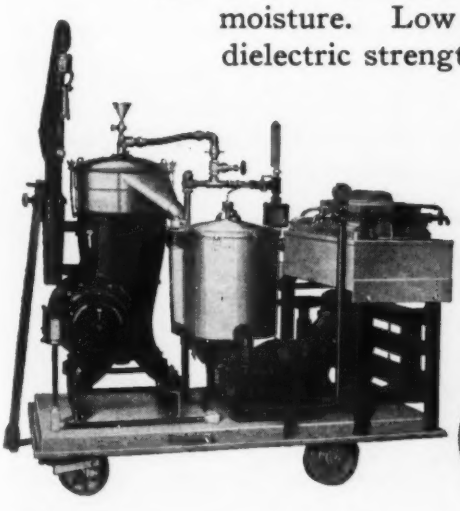
**A.** To remove colloidal carbon from the oil.

**Q.** Does the blotter press with the De Laval Insulating Oil Purifier system help restore the dielectric?

**A.** No. All of the actual work of restoring the high dielectric is done by the centrifugal machine.

**Q.** Why is it an advantage to purify oil at a low temperature?

**A.** It is safer than by methods demanding relatively high heat to drive off moisture. Low temperature purification prevents rapid reduction in dielectric strength of the oil after purification.



THE DE LAVAL SEPARATOR COMPANY
165 Broadway, New York 6 427 Randolph St., Chicago 6
DE LAVAL PACIFIC CO., 61 Beale St., San Francisco 5
THE DE LAVAL COMPANY, Limited, Peterborough, Ont.

# DE LAVAL

## INSULATING OIL PURIFIERS

# MANUFACTURERS and MARKETS

## Aluminum Trend Is from Northwest Hydro to South Central Natural Gas

From the Northwestern to the South Central states, from electricity produced by water to that produced by natural gas, these are the changes being made by the aluminum industry.

Stymied by the inability of Northwest hydro plants to provide power for increased operation, the nation's three biggest aluminum producers will build or add to their plants in the South Central area. The power, which the industry needs in huge amounts, will come from thermal stations fueled by natural gas.

Aluminum Co of America will erect an aluminum producing plant at Point Comfort, near Port Lavaca, Tex. The 3,000-acre site is on Matagorda Bay, in the area between Houston and Corpus Christi. The project is to be ready in two years.

Alcoa installations will include a smelting plant with two potlines, a plant for manufacture of carbon electrodes required in the electrolytic aluminum-producing process, an 80,000-kw power plant, and general service facilities.

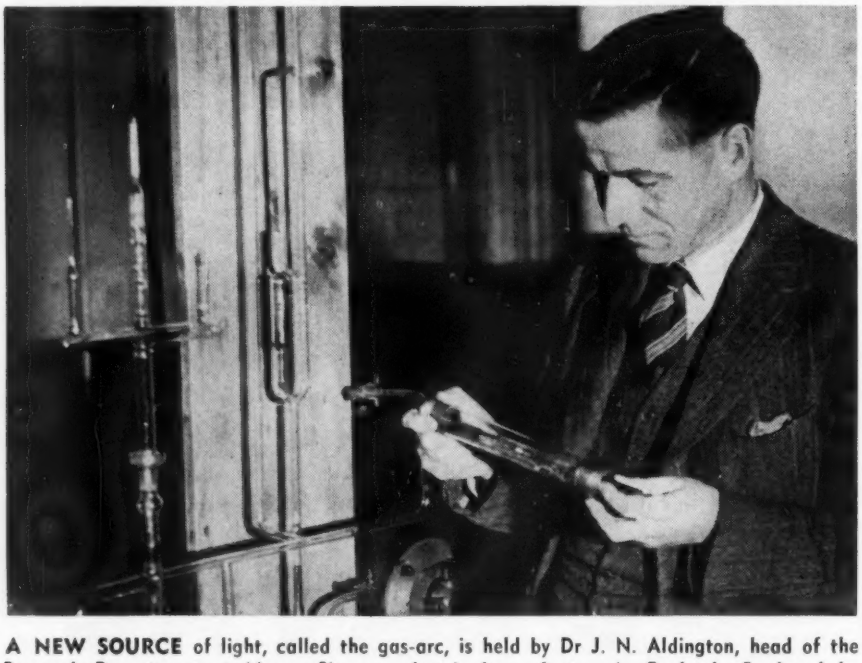
Docking facilities for the unloading of materials and supplies shipped to the plant by water will be constructed. Purified ore for conversion into aluminum will be obtained from the company's plant at Mobile, Ala.

A railroad, 12 miles long, will be built from Point Comfort to the Missouri Pacific RR at Lollita. The railroad has already been chartered by Texas as the Point Comfort & Lollita Railroad Co.

Kaiser's Permanente Metals Co is expected to announce shortly the expansion of its Baton Rouge alumina plant to include several potlines for aluminum. Power would be generated with natural gas as fuel. There is a possibility that Kaiser may find it difficult to secure enough natural gas.

Because both companies may have trouble getting generating equipment, Reynolds Metals Co may be the first to boost its production. Next year, Reynolds may have enough power to put two idle potlines at its Jones Mill, Ark., plant into operation. This power will come from the Arkansas Power & Light Co which is completing a war surplus power plant at Lake Catherine.

The South Central area has some advantages over the Northwest which will compensate for the higher cost of electricity. Bauxite, from which alumina is made, comes from Arkansas and from foreign countries. By manufacturing aluminum in this section also freight costs are reduced. In addition much of the aluminum made is used in the East making other savings possible.



**A NEW SOURCE** of light, called the gas-arc, is held by Dr J. N. Aldington, head of the Research Department at Messrs Siemens electric lamp factory in England. Produced by conduction of electricity through Xenon, heaviest of the inert gases, at high current densities, the light is almost indistinguishable from daylight. The lamp gives off little heat, has a satisfactory life, and does not need constant attention like a carbon-arc lamp. The photograph was taken by the light of the lamp at one-fiftieth of a second at 6.3

•

## Rowe Engineering Corp Organized in Chicago

Rowe Radio Research Laboratory Co, Chicago, has announced the formation of Rowe Engineering Corp, under which name all new business will be transacted hereafter. Rowe Radio, however, will continue to operate simultaneously, probably through 1948, until several large government contracts are completed.

Officers of the newly formed Rowe Engineering Corp are Harry C. Rowe, president and director of engineering; Robert P. Faust, vice-president in charge of sales; S. Charles Kohl, secretary and treasurer and Dwight V. Sinninger, chief engineer. All these men are also directors of the corporation.

The new organization will engage in consulting engineering and on design and development projects covering electronics and nucleonics. The address of Rowe Engineering Corp is 2422 North Pulaski Road. Chicago 39.

•

## National Electric Products Buys Joshua Hendy Plant

National Electric Products Corp, Pittsburgh, has purchased the Joshua Hendy Iron Works plant in Torrance, Calif, for production of flexible conduit and tubing and other electrical fittings.

W. C. Robinson, president of National Electric, said production will start in

Look, Joe,
that POLE STAR★ Transformer may be light enough to carry up the pole, but regulations say we must use a block and tackle!

Carrying a Distribution Transformer up a pole may be a little too much for the average lineman. However, the fact remains that Pennsylvania POLE STAR Transformers are lighter in weight and smaller in dimensions than their predecessors. For example, a 25 Kva POLE STAR Transformer is 22% lighter and 33% smaller. This is due primarily to the small, compact core, wound of the finest grade, high permeability, cold rolled, oriented, silicon steel.

Laminations are arranged so that all the flux circulates with the grain and none across the grain. Single laminations are individually lapped which, in effect, means that each lamination is a core in itself.

Each lamination forms a flux path of its own and no flux has to cross from one turn to the next. Since no concentration of flux exists at any point, losses and exciting current are kept down to a very low value.

Embodying a new wound core design with an inherent low exciting current, POLE STAR Transformers are made in sizes 25 Kva and below, 14400 volts and below, single phase, 60 cycles, OISC, conforming to EEI-NEMA Standards.

★P.S.

Let the POLE STAR be your guide

Product Of Long Experience

Safe Thrifty And Reliable

PENNSYLVANIA POLE STAR TRANSFORMER

**Pennsylvania TRANSFORMER COMPANY**

PITTSBURGH 12, PENNSYLVANIA

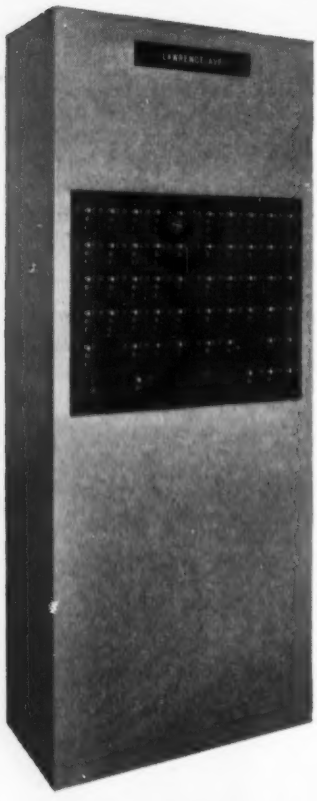
# put a 1-2 punch into your Power System

## with SUPER-TROL

THE MODERN METHOD OF SUPERVISORY CONTROL

**1 Select and Operate**

**2 See Proof of Operation**



A typical Super-Trol Dispatcher's Cubical may be arranged for large or small power systems as required.

With SUPER-TROL just two simple operations provide continuous control of your power system. Put yourself in the dispatcher's place for just a minute. See how simple and reliable SUPER-TROL really is:

- First—you select the operation desired. You may want to open or close a breaker . . . start or stop a remote generator . . . do special telemetering. As you move the selector toggle switch a white light appears. This shows that a change is contemplated. Now you push the operating button. Immediately the frequency signals go out over the remote control circuit and SUPER-TROL goes into action.
- Second—you see positive proof of the completed operation. The white light is out. Colored lights immediately show that the desired operation has been completed. There are no false operations. No guesswork. SUPER-TROL is always accurate . . . fast . . . reliable.

CONSTANT AUTOMATIC SUPERVISION

The SUPER-TROL dispatcher always knows the exact condition of all equipment . . . what breakers are open or closed and where. Indications can be in the form of an electrical map which gives a constant overall picture of your system. If protective equipment opens a breaker, the dispatcher receives both an audible alarm and a visible signal.

**Write today for engineering recommendations for your system**

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• Super-Trol • Peak-Trol • Telemetering • Battery Chargers • Carrier Current •


September in the 131,000-sq ft plant to satisfy increased demand, especially from western customers.

The Hendy firm bought the plant in 1942 for production of concrete mixers, cranes and printing presses. Its operations will be transferred to another site not yet determined.

•

## Manufacturers Make New Sales Assignments

Electrical manufacturing companies have recently made the following appointments to their sales staffs:

**A. B. Chance Co,** Centralia, Mo., has appointed four division sales managers and a field engineering specialist. The new division managers are Charles T. Nevins, eastern division, New York; O. M. Hullinger, midwestern division, Chicago; W. A. Moss, southeastern division, Atlanta; and Dwight E. Argo, southwestern division, Dallas. Lester R. Crane is the new field engineering specialist, with headquarters in Centralia, Mo. Mr Nevins, until recently district manager in the eastern states for Oliver Iron & Steel Corp, succeeds J. R. Rice as eastern division manager. Mr Rice has moved to Denver because of his health. Mr Hullinger was formerly Chicago manager for Elastic Stop Nut Corp. For many years, southeastern district manager, Mr Moss has been promoted to division manager in the southeastern states. Mr Argo, for three years southwestern district manager, has been promoted to division manager for the states of Texas, Oklahoma, Louisiana and Mississippi. Mr Crane was formerly a midwestern sales representative.

**Avco Manufacturing Corp,** Cincinnati, Crosley Division, has appointed Frank D. O'Sullivan, Jr, as southeastern regional manager. Mr O'Sullivan will cover distribution outlets in Atlanta and Savannah, Ga.; New Orleans, La.; Charlotte, N. C.; Memphis, Tenn.; Jackson, Miss.; Birmgham, Ala.; and Jacksonville, Tampa, Orlando, and Miami, Fla.

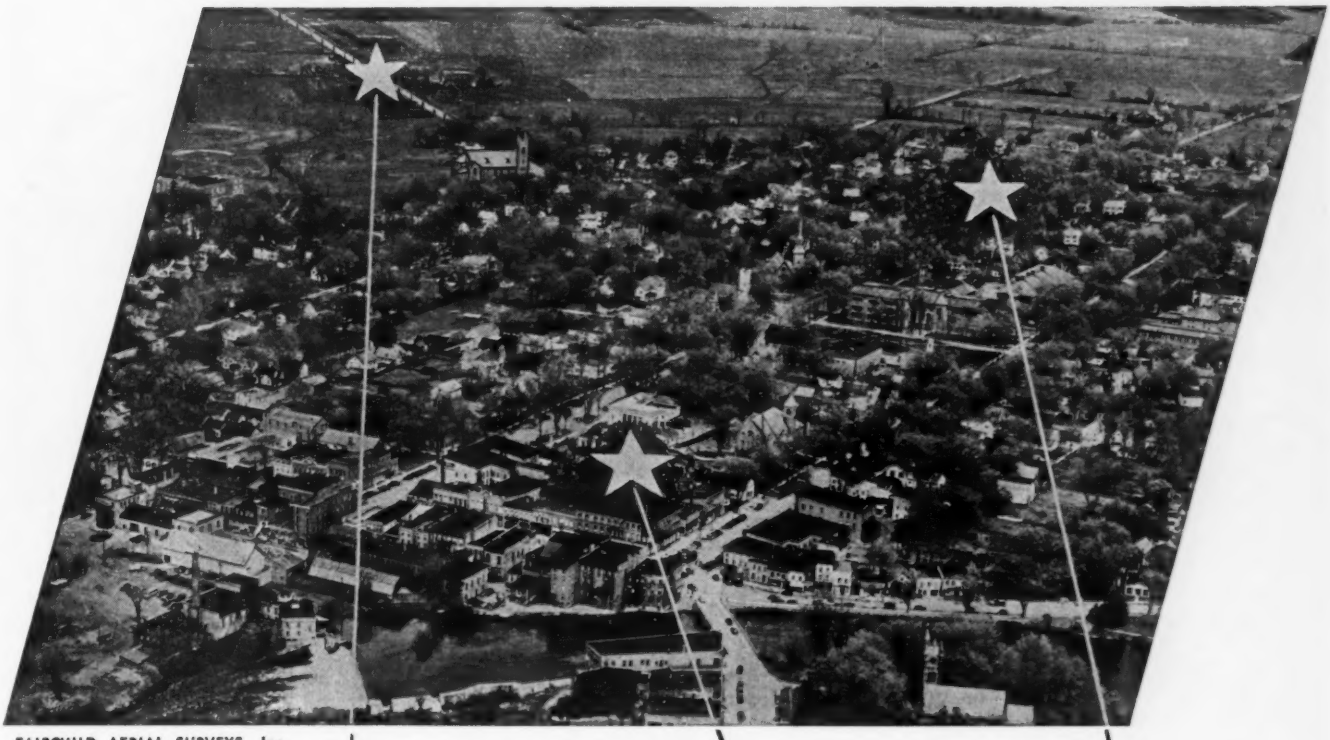
**The Frink Corp,** Long Island City, N. Y., has appointed H. M. Stacy representative in the New England States, with headquarters at 12 Simpson Terrace, Newtonville, Mass.

•

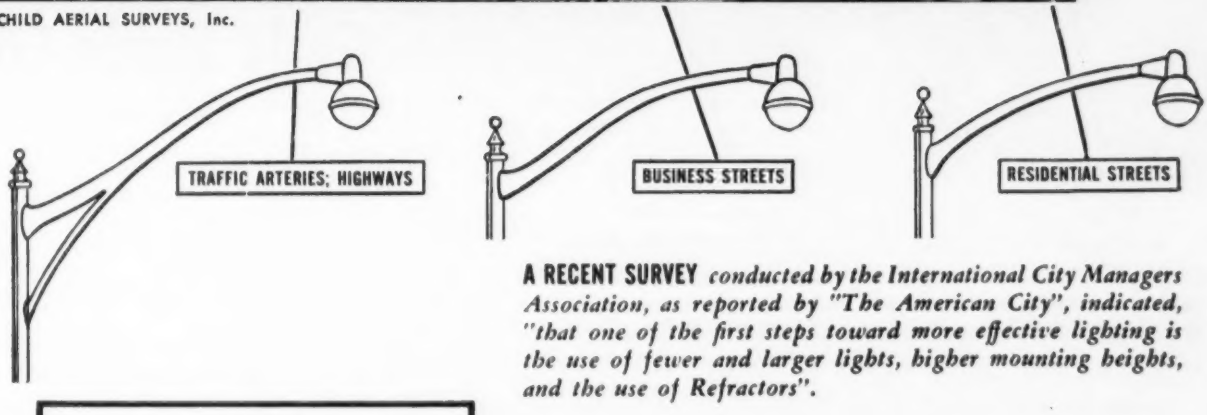
## Revise GE Pension Plan

Retroactive pension payments, totaling $201,000, will be paid to 1,144 retired employees of the General Electric Co under a revision of the company's pension plan recently passed by the board of directors. Under a revision, a minimum "past service" pension of $12 for each year of continuous service prior to Sept. 1, 1946 has been extended to all persons on the pension roll as of Feb 1, 1948. Previously, this minimum pension was granted only to persons retiring after September 1946, when the minimum was established. The largest retroactive payment to one individual will amount to $594.72.

# Modern CITIES USE HOLOPHANE REFRACTORS for STREET LIGHTING that REDUCES ACCIDENTS

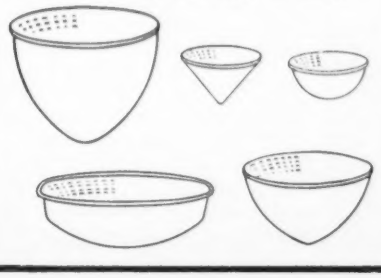


FAIRCHILD AERIAL SURVEYS, Inc.




**A RECENT SURVEY** *conducted by the International City Managers Association, as reported by "The American City", indicated, "that one of the first steps toward more effective lighting is the use of fewer and larger lights, higher mounting heights, and the use of Refractors".*

Holophane **REFRACTORS** are available for Every Size and Type of Lamp.



**STANDARDIZE ON REFRACTORS** . . . Holophane now furnishes a wide variety of Street Lighting REFRACTORS for every traffic condition . . . for all job mounting applications . . . for narrow and wide thoroughfares . . . Holophane REFRACTORS provide greater visibility per lighting dollar because they put the light where it is most needed on the street. They build up pavement brightness with more uniform distribution. Result: improved safety conditions, less night accidents and fatalities, and the appearance of an efficient, prosperous community.

**HOLOPHANE COMPANY, INC.**

*Lighting Authorities Since 1898* · STREET LIGHTING DEPARTMENT, NEWARK, OHIO

THE HOLOPHANE COMPANY, LTD., THE QUEENSWAY, TORONTO 14, ONTARIO

GOLDEN JUBILEE Holophane SINCE 1898 SCIENTIFIC ILLUMINATION

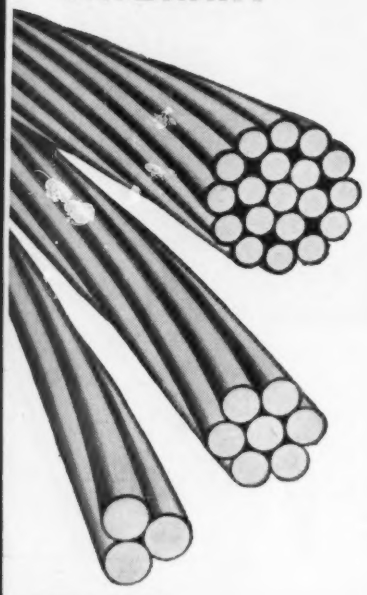
# PAGE

*Stainless Steel*

**STRAND**

**for**

**GROUND**
**GUY**
**MESSENGER**
**CATENARY**



***Higher***

**in Corrosion Resistance**
**Tensile Strength**
**Elastic Limit**
**Resistance to Vibration**
**Strength to Weight Ratio**

***Lower***

**in Cost per Year**
**of Installed Life**

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## RECENT RATE CHANGES

GEORGIA POWER & LIGHT Co has been authorized by the state Public Service Commission to increase electric rates to all classes of customers to offset the increase in cost of fuel oil. The utility will add to its charges for service under its residential rate schedule D-1, commercial rates schedules C-1, C-2, H-2 and H-3, a separate charge of 10% of the gross amount and 10% of the net amount as an adjustment to offset the increased cost of fuel oil. Energy charge increase or decrease of 13/100 of a mill per kwhr for each five cents above $1.05 or below 90 cents per barrel in price of fuel oil f.o.b. Port Tampa, Fla., will be made on billings to large power rate schedule P-1, grist mill rate schedule P-3 and refrigeration and ice manufacturing rate schedule P-5. Wholesale municipal rate schedule M-4 and wholesale REA rate schedule M-5 incorporate a fuel adjustment clause of 13/100 of a mill per kwhr for each five cents above $1.85 or below 90 cents per barrel of fuel oil f.o.b. Port Tampa. The maximum rate for residential and commercial water heating service shall be 1.39 cents, and 1.25 cents net per kwhr with the same provisions as to minimum charge and prompt payment discount as are now in effect. All new rates became effective May 15.

SAVANNAH ELECTRIC & POWER Co has been granted a rate increase in fuel clause of power users. The Georgia Public Service Commission has granted a fuel adjustment of increase or decrease of 0.0075 cents per kwhr for each one-half cent decrease below 15 cents, or increase over 28 cents in weighted average cost per 1,000,000 Btu of all fuel used. Oil cost includes freight, storage and unloading costs. The rate adjustment will increase rates to customers of the D-4 rate by approximately $143,000 a year. The company has asked for a rate of 0.009 cents per kwhr.

LAWRENCE GAS & ELECTRIC Co has been authorized by the Massachusetts Public Utilities Commission to reduce its electric rates, beginning July 1, $105,500 annually to residential and commercial customers. Industrial and special rates remain unchanged.

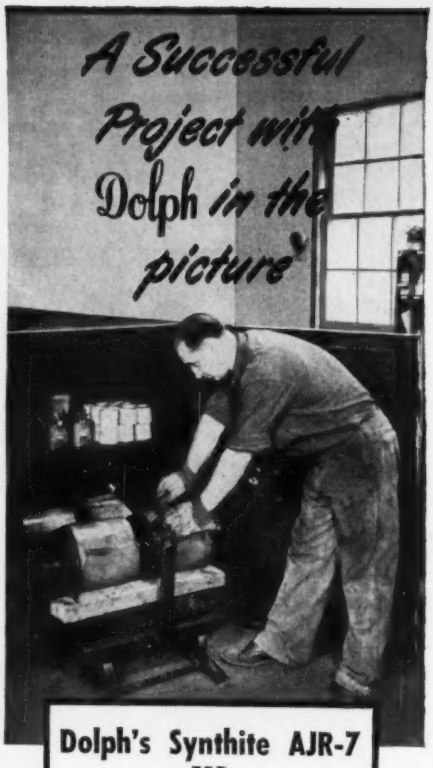
•

## GE to Start Construction on Champaign Lamp Plant

Construction of a factory in Champaign, Ill., will begin soon by the lamp department of General Electric Co, Frank C. Perkins, manager of the parts manufacturing division, has announced.

The new plant, which will cost approximately $1,200,000 will be located on a factory site of about 10 acres just outside the Champaign city limits on North Market St. The proposed factory will be a one-story building about 50,000 sq ft in area. An office section will face the street and will cost about half a million dollars.

Parts for fluorescent lamps, now being made at Mattoon, Ill., and Jackson, Miss., will be manufactured in the new factory.


**Dolph's Synthite AJR-7**
**FOR**
**Economical Insulation**

# What Are Little Coils Made Of?

**(or big ones)**

The Nothelfer Winding Laboratories, Trenton, New Jersey, needed an insulating varnish that would:

Provide high heat-resistance and high dielectric strength to their custom-designed, custom-built coils — at a moderate cost.

Dolph's Synthite AJR-7 Clear Baking Varnish does the job for them. It also affords rapid, deep-curing and excellent bonding at lower temperatures than similar type varnishes usually require.

Dolph's Synthite AJR-7 is not affected by oil, acid, or moisture. It is exceptionally stable in the dip-tank, affords a build-up of 4½ mils per coat, and has a life of over 500 hours at 212°F. Synthite AJR-7 is an ideal all-purpose varnish for both production and repair.

Why not call on our Technical Service? These men are thoroughly trained to help you plan your preheating, impregnating, draining, and baking cycle. They'll recommend the *correct* varnish for you. Meantime, write for our catalog. John C. Dolph Co., 1062 Broad Street, Newark, New Jersey.

**Member Electrical Insulating Varnish Section, NEMA**

Dolph's **INSULATING VARNISH SPECIALISTS**

## NEW ELECTRICAL CONSTRUCTION

**NEW ELECTRICAL construction projects announced by private and government utility systems involving more than $70,000. Also listed are major industrial and construction jobs where electrical work is included**

### UTILITIES

#### *Proposed Construction*

**Arizona-Nevada**—Bureau Reclamation, Dpt. Interior, Bldg. 1A, Denver Federal Center, Denver, Colo., del. f.o.b. cars shipping point or f.o.b. cars Prescott, transformers, miscellaneous switches, electrical equip. for Prescott Substation, Davis Dam Proj., Spec. 2261. Plans deposit $2.

**California** — Bureau Reclamation, Dpt. Interior, Bldg. 1-A, Denver Federal Center, Denver, Colo., furnishing, del. f.o.b. cars shipping point, or f.o.b. cars Sacramento and Bethany, one main control board and I indoor unit substation, 600 kva. capacity, with non-inflammable-liquid-filled transformer for Elverta Substation, unmounted switchboard equip. for Tracy Switchyard, Central Valley Proj., Spec. 2251. Plans deposit $1.25. Walter R. Young, Denver, Colo., ch. eng. and archt.

**Colorado** — Bureau Reclamation, Dpt. Int., Bldg. 1A, Denver Federal Center, Denver, Colo., furnishing, del. f.o.b. cars shipping point, f.o.b. cars Wiggins and Brush, two 3,750 kva. and two 6,000 kva. transformers and lightning arrestors, Colorado-Big Thompson Proj. Spec. 2260. Plans deposit $1. Walker R. Young, ch. engr. and archt.

**Fla., Gainesville**—State Imprvt. Comn., 502 S. Adams St., Tallahassee, exterior electric distr. sys. at Florida Farm Colony. Plans deposit $10. Guy C. Fulton Associates, Gainesville, engrs.

**Idaho**—Bureau of Reclamation, Dpt. Interior, Bldg. 1-A, Denver Federal Center, Denver, Colo., furnishing, del. f.o.b. cars shipping point or f.o.b. cars Mountain Homes, distr. transformer, etc. for Anderson Ranch Power-plant, Boise Proj., Spec. 2254. Plans deposit $1.25. Walker R. Young, Denver, Colo., ch. engr.

**Ind., Indianapolis** — Western Electric Co., 195 Broadway, New York, N. Y., plans by Allen & Kelly, 435 Architects & Builders Bldg., 1 story, brick, rein.-con., structural steel mfg. plant, Shadeland Dr. between 25 St. and Big Four Ry. **$25,000,000.**

**Nebraska** — Bureau Reclamation, Dpt. Interior, Bldg. 1-A, Denver Federal Center, Denver, Colo., furnishing, del. f.o.b. cars shipping point or f.o.b. cars Ogallala, three 2,500 kva. outdoor transformers, etc. for Ogallala Substation, Transmission Lines Unit, Missouri Basin Proj., Spec. 2255. Plans deposit $2.25. Walker R. Young, Denver, Colo., ch. engr.

**N. C., Camp Lejeune (br. New Bern)**—Pub. Wks. Office, Building 1005, Marine Barracks, replacing electric generating unit, Marine Barracks, Spec. 19907. Plans deposit $25.

**Texas**—U. S. Eng., at Government Aircraft Plant No. 3, 2000 North Memorial Dr., Tulsa, Okla., installing electrical equip. and switchyard structures, Denison Dam and Reservoir, Inv. No. Eng. 34-066-48-132.

**Texas**—Houston Lighting & Power Co., 1016 Walker St., Houston, electric power transmission lines and distribution facilities, Waller area, Waller Co., **$800,000**; Rosenberg area, Fort Bend Co., **$1,000,000.**

**Tex., Anahuac** — Houston Lighting & Power Co., 1016 Walker St., Houston, electric power generating station, **$1,000,000**; electric power transmission lines and distr. facilities, **$750,000.**

**Tex., Angleton** — Houston Lighting & Power Co., 1016 Walker St., Houston, electric power generating station, **$1,500,000**; electric transmission lines and distr. facilities, **$1,250,000.**

**Tex., Bay City**—Houston Lighting & Power Co., 1016 Walker St., Houston, electric power generating station, **$2,000,000**; transmission lines and distr. facilities, **$1,000,000.**

**Tex., Bellville** — Houston Lighting & Power Co., 1016 Walker St., Houston, generating station, **$1,500,000**; transmission lines and distr. facilities. **$750,000.**

**Tex., Bryan**—City, Noah W. Dansby, city secy., C-1, East Side electric distr.


HEVI DUTY ELECTRIC COMPANY

Planned Built and Tested for maximum service

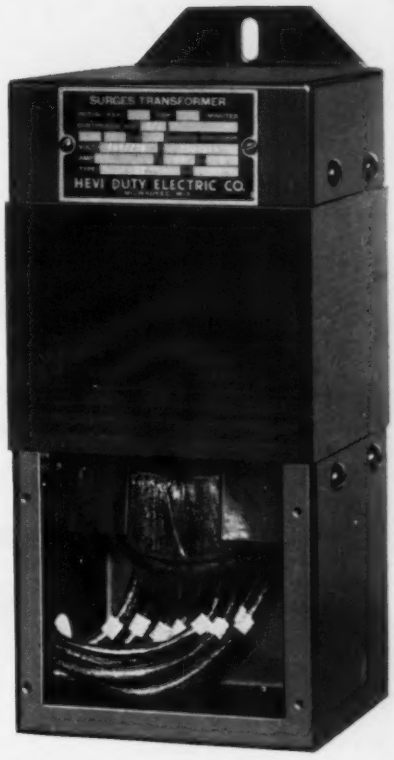
Surges DRY TYPE Indoor Distribution TRANSFORMERS

TYPE SI
Single Phase Insulating Type Transformers — 60 Cycle

These transformers are used primarily for lighting and other miscellaneous power requirements. They are made with Class A insulation and are designed for continuous operation at a temperature rise of 55° C. Transformers up to 10 KVA, when installed inside the cabinet of a machine tool, may, to conserve space, be operated without the junction box.

TYPE SA
Single Phase Auto Transformers — 60 Cycle

This type is used for stepping voltage down from 240 volts 2-wire to 120 volts 2-wire in connection with polarity wiring on a grounded system. Sizes to 20 KVA have large hand hole covers for easy accessibility to transformer leads and provide an easy means of making conduit connections.

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DRY TYPE TRANSFORMERS — CONSTANT CURRENT REGULATORS
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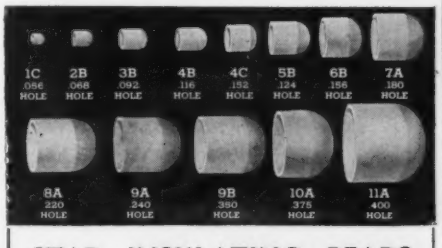


STAR INSULATING BEADS

Use LOVALAIN ball and socket beads for insulating bare wire. Heat resistant. High di-electric and mechanical strength. Made in U.S.A. Quality beads at low cost. Quickly applied. Flexible. Beads shown above are approximately half actual size. Ask for price list and samples.

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Cost less to use Premax All-Metal Stamped and Embossed Markers. Available in standard or special designs.

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ALL-METAL CONSTRUCTION

The finest tripod of its kind on the market today. Smooth operating roller bearings enable it to be set up or taken down in an instant. Folds compactly for storing in truck, trailer or street tool box.
Construction of T-Iron and Steel Tubing. Will give long, satisfactory service.

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Safety Equipment for all Industries
INDUSTRIAL PRODUCTS COMPANY
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sys., imprvs. and C-2 Downtown electric distr. sys. $100,000. Plans deposit $25. Freese & Nichols, 407 Danciger Bldg., engrs.

**Tex., Conroe** — Houston Lighting & Power Co., 1016 Walker St., Houston, generating station, **$850,000**; electric transmission lines and distr. facilities, **$450,000.**

**Tex., Galveston**—Houston Lighting & Power Co., 1016 Walker St., Houston, electric generating plant, **$1,250,000**; electric power transmission lines, **$1,500,000.**

**Tex., Liberty** — Houston Lighting & Power Co., 1016 Walker St., Houston, electric generating power station, **$1,500,000**; transmission lines and distr. facilities, **$1,000,000.**

**Tex., Waller** — Houston Lighting & Power Co., 1016 Walker St., Houston, electric generating station. **$1,500,000.**

### *Low Bidders & Contracts Awarded*

**Conn., Waterbury** — Connecticut Light & Power Co., 250 Dwight St., brick, concrete generator plant addn., Railroad Hill St. Owner builds. **$70,000.**

**Ind., Frankfort**—Bd. P. Wks., Frankfort, May 19, imprv. municipal power plant, 10,000 kw. turbo-generator unit, from Elliot Co., Jeanette, Pa., **$332,000*** condenser, from C. H. Wheeler Mfg. Co., 19 and Lehigh Ave., Phila., Pa., **$76,000** ***colling tower, from J. F. Pritchard & Co., 205 W. Wacker St., Chicago, Ill., **$63,161.** Est. $500,000.

**Ky., Owensboro**—City Utilities, Owensboro, imprv. muncipal power plant, incl. 3 m. g. underground concrete water storage tank, to Ellis, Kelly & Co., Owensboro, **$214,464.** Est. $225,000.

**Montana** — Bureau Reclamation, Dpt. Interior, Bldg. 1-A, Denver Federal Center, Denver, Colo., four 105,000 hydraulic turbines for Hungry Horse Powerplant, Hungry Horse Proj., Spec. 2113, to Allis-Chalmers Mfg. Co., Continental Oil Bldg., Denver, Colo. **$2,150,000.** Bids 3/30, awarded 5/19.

**Wis., Racine**—Milwaukee Electric Co., 231 W. Michigan St., Chicago 3, Ill., substation, own forces. **$119,500.**

## INDUSTRIAL, COMMERCIAL & PUBLIC BUILDINGS

### *Proposed Construction*

**Calif., Berkeley** — General Research, Atomic Energy Comn., University of California, plan by Hertzka & Knowles, 85 Post St., San Francisco, 3 story, rein.-con., 46,000 sq. ft. radiation laboratory. **$1,000,000.**

**Md., Bethesda** — Federal Security Agency, 4 St. and Independence Ave. S.W., Wash. 25, D. C., 500-bed hospital and research center for National Institute of Health, Rockville Pike. **$56,000,000** will be utilized in fiscal 1948. Total cost $40,000,000.

**Mass., Boston**—City, James E. Curley, Mayor, City Hall, underground garage with 4,400 car capacity, under Boston Common entrance Charles St. **$5,000,000.** Whitman & Howard, 89 Broad St., consult. engrs.

**Minn., St. Louis Park**—Bd. Educ., H. E. Whalen, clk., voted **$750,000** bonds, bldg. school, remodeling, equip. schools, addn. to existing bldg.

**Okla., Stillwater** — A. & M. College, Stillwater, plans by Sorey, Hill & Sorey, 1st Natl. Bldg., Oklahoma City, library. **$2,000,000.**

### *Low Bidders & Contracts Awarded*

**Md., Jacobsville**—Anne Arundel Co. Bd. Educ., David S. Jenkins, supt., Annapolis, 2 story, bsmnt., Greenhaven Junior High School, from Mullan Contg. Co., 3945 Greenmount, Baltimore. **$1,211,536.** Ed. H. Glidden, Jr., 414 Equitable Bldg., Baltimore archt. Van Rensselaer Saxe, 100 E. Monument St., Baltimore, structural engr. James Posey, 10 E. Pleasant St., Baltimore, mechanical engr.

**Ore., Portland**—National Biscuit Co., 1129 N. W. Davis St., plans by Glenn Stanton, Concord Bldg., 1 story, 350,000 sq. ft. biscuit factory on 25-acre tract being purchased on N.E. Columbia Blvd. and N.E. Vancouver Ave. **$6,000,000.** Ford, Bacon & Davis, Inc., 39 Broadway, New York, N. Y., consult. engrs.


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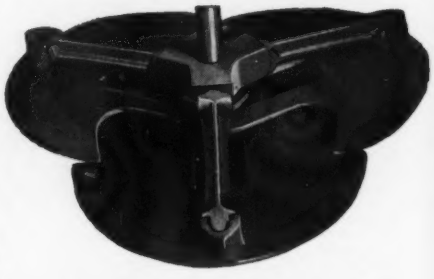

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# CATALOGS • BULLETINS

●TRANSFORMERS: Construction, mounting, surface treatment and EEI-NEMA data for an improved line of distribution transformers, 100 kva and below, 15 kv and below, single-phase, 60-cycle, 55C rise, are presented in Bulletin 61B6159A. Allis-Chalmers Mfg Co, Milwaukee, Wis.

●FAULT LOCATOR: Technical features of the equipment and a method of locating ground faults on overhead distribution lines are outlined in a 4-page pamphlet. Eltron, Inc, Jackson, Mich.

●CONNECTORS: A 6-page folder provides description, sizes and illustrations of a line of connectors, splicers, dead ends, hot line taps and aerial cable accessories. Fargo Mfg Co, Inc, Poughkeepsie, N. Y.

●PORTABLE CABLES: A 68-page catalog lists line of Tirex Selenium neoprene-armored portable cords and cables, also a description of the Simplex "cured in head" process. Simplex Wire & Cable Co. Advertising Dept, 79 Sidney St, Cambridge 39, Mass.

●TRANSFORMERS: Construction, voltage classes, ratings, comprehensive data and illustrations are contained in three new publications covering single-phase distribution transformers: Bulletin 16-C-1 conventional line; Bulletin 16-31-1, completely self-protected line; Bulletin 16-R-1, rural line. Line Material Co, Milwaukee 1, Wis.

●DISCONNECT SWITCHES: A 10-page pamphlet carries design and operating information and specifications of type YSW outdoor group-operated, side-break 400 to 1200 amp. 7.5 to 115 kv air switches. Pacific Electric Mfg Corp, 5815 Third St, San Francisco 24, Calif.

●SWITCHING EQUIPMENT: Bus-supports, outdoor and indoor switches, motor mechanisms and line hardware, guy insulators, are some of the products listed in Catalog 11. Royal Electric Mfg Co, 1122 E. 87th St, Chicago 19, Ill.

●TRANSFORMERS: Variac continuously adjustable transformers type V-10, and other types are described in an 8-page pamphlet. General Radio Co, Cambridge 39, Mass.

●CAPACITORS: Notes on application, mounting arrangements, description of step-by-step manufacturing, and shipping information are included in Bulletin 47075 on Elemex shunt capacitors. Line Material Co, Milwaukee, Wis.

●INSULATION TESTERS: Technical information on insulation and ground resistance testing, and insulation breakdown testing, also descriptions of ohmmeters, soil resistivity meters, limit bridges and Keeler Polygraph (lie detector) are contained in a precision instrument catalog. Associated Research, Inc, 231 S. Green St, Chicago 7, Ill.

●BACKSTOP: Bulletin 10,080 provides information on construction, operating advantages, sizes and capacities of a backstop to prevent rotation. The Falk Corp, 3001 West Canal St, Milwaukee, 8, Wis.


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# BOOK REVIEWS

***Electric Power and Government Policy.*** **Published by the Twentieth Century Fund, New York 18, N. Y. 860 pages, illustrated. Price $5.**

Ten years ago the Twentieth Century Fund set up a special committee headed by J. Henry Scattergood to survey the relations between the electric utility industry and the government—federal, state and municipal. Private utility members of the group were Samuel Ferguson and Paul A. Schoellkopf. A condensed version of the committee report was released in 1944 and this is the full report which was delayed by the war.

The report first traces in well-documented manner the regulatory history of the industry and the financial philosophy of the private systems. Subsequent chapters discuss the market-area factors which led to expansion and mergers, the history of the municipal utility movement, the initiation of the rural cooperatives and the program of government projects and districts. The general conclusion at this point is that there should be framed a national power policy which will assign a limited place and defined function for government projects in an evolving nation-wide power system.

Comprehensive recommendations pertain to the relative merits and defects of various regulatory philosophies. Open and frank negotiation is offered as superior to both the laborious rate case procedures and the short-cut alternatives. Separation of wholesale generation and retail distribution is also advocated. Regional regulatory boards and a coordinated national power system are other advocacies.

The book should serve as an authentic reference for the facts and the issues which marked a formative and transitional era in the field of electric power.

**Code for Electricity Meters (Revision). Published by American Standards Association, New York.**

The changes in schedule for periodic testing of watthour meters approved early in the war have now been confirmed anew (August 1, 1947). A page presenting the revised schedule is obtainable from ASA for 25 cents for pasting over the former paragraph 827 on page 98. The changes consist only in setting the interval of 96 months for a-c meters up to and including 12 kva in place of 72 months for a-c meters up to and including 6 kva. The footnote further adds an explanation of the method of computing the rating of 2-element meters used on 4-wire circuits.

***Frequency Analysis, Modulation and Noise.*** **By Stanford Goldman. Published by McGraw-Hill Book Co, Inc, New York 18, N. Y. 434 pages, illustrated. Price $6.**

The opening half is devoted to the Fourier Series analysis of wave forms including the technique of modulation (amplitude, frequency and phase). Incidentally it explains how the hybrid procedure of FM broadcasting renders the reception comparatively free of noise. The second half analyses the sources of radio noise within and without the receiver and ways of diagnosing and correcting the intrusions. Appendices carry tables of integrals, trigonometric identities. Bessel and Fourier functions.

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